JIEO CIRCULAR 9008
30 JUNE 1993
with 20 June 1997 errata incorporated

DEFENSE INFORMATION SYSTEMS AGENCY

JOINT INTEROPERABILITY AND ENGINEERING ORGANIZATION

NATIONAL IMAGERY TRANSMISSION FORMAT STANDARD (NITFS)

CERTIFICATION TEST & EVALUATION PROGRAM PLAN

FOREWORD

The National Imagery Transmission Format Standard (NITFS) is the standard for the formatting and exchange of digital imagery and imagery-related products between members of the Intelligence Community (IC). The IC is made up of the Department of Defense (DOD) and other departments or agencies of the United States Government as defined by Executive Order 12333.

This Certification Test and Evaluation (CTE) Program Plan has been developed by the Defense Information Systems Agency (DISA) Joint Interoperability Test Center (JITC) in coordination with the Imagery Standards Management Committee (ISMC) based upon current policies, procedures, and guidelines received from the DOD and the Central Imagery Office (CIO). The JITC is the responsible organization for execution of the NITFS Certification Testing Program.

The DOD and members of the IC are committed to interoperability of systems used for formatting, transmitting, receiving, exchanging, and processing imagery and imagery related information. This CTE Program Plan describes the processes and procedures for obtaining certification of imagery systems for compliance with the NITFS. It also prescribes NITFS CTE Program policies, defines roles and responsibilities of participating organizations, and provides certification funding guidance.

Beneficial comments (recommendations, additions, deletions) and other pertinent data which may be of use in improving this document should be addressed to: Joint Interoperability Test Center, NITFS Certification Test and Evaluation Facility, ATTN: TCBD, FT. Huachuca, AZ 85613-7020.

FOR THE COMMANDER:

P. W. BOWER
Captain, USN
Chief of Staff

NOTE: Incorporated in this release of the 30 June 1993 version of the JIEO CIRCULAR 9008 are all of the approved Request For Change (RFC) additions (in red) and deletions (~~strikeout~~) through 20 June 1997. Attached at the end of this document are the 20 June 1997 Errata Sheets.

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LIST OF NITFS FORMS

EXECUTIVE SUMMARY

This document establishes the National Imagery Transmission Format Standard (NITFS) Certification Test and Evaluation (CTE) Program for achieving and sustaining NITFS compliance by all fielded and developmental digital imagery systems. It describes the processes and procedures for obtaining certification of imagery systems for compliance with the NITFS. It also prescribes NITFS CTE Program policies, defines roles and responsibilities of participating organizations, and provides certification funding guidance.

The Central Imagery Office (CIO) oversees the process whereby digital imagery systems achieve and sustain NITFS compliance through the CTE Program. Initial certification of an imagery system is achieved at the NITFS CTE Facility located at the Joint Interoperability Test Command (JITC). Compliance is sustained through recertification, as necessitated by validated changes to the NITFS, changes to (or problems with) certified NITFS configuration items, or when directed by CIO, as long as the imagery system is operational.

As changes or additions are nominated for inclusion in the NITF Standard, they are validated through testing prior to being forwarded to the Imagery Standards Management Committee (ISMC) for approval for implementation and addition to the certification requirements of the NITFS certification test program.

NITFS implementation requirements for certification are detailed in this plan. System sponsors request and sustain NITFS certification using the procedures described herein. A register of NITFS certifications is maintained by the JITC NITFS CTE Facility at Fort Huachuca, Arizona.

CHAPTER 1

INTRODUCTION

1-1 PURPOSE

This document establishes the National Imagery Transmission Format Standard (NITFS) Certification Test and Evaluation (CTE) Program for achieving and sustaining NITFS compliance by all fielded and developmental digital imagery systems. It describes the processes and procedures for obtaining certification of an imagery system for compliance with the NITFS. It also prescribes NITFS CTE Program policies, defines roles and responsibilities of participating organizations, and provides certification funding guidance.

1-2 SCOPE

This document contains technical and administrative information regarding NITFS certification test planning, execution, and reporting. It provides details on:

A. Certification Process

B. Recertification Process

C. Certification Testing Criteria

D. Certification Test Planning

E. Test Data Collection Requirements

F. Certification Test Reporting

G. Requesting Waivers

H. Reporting Functional Problems With NITFS Certified Systems

I. Reporting Changes to NITFS Configuration Items

J. Validating Proposed Enhancements to NITFS

1-3 REFERENCES

A. MIL-HDBK-1300A. *Military Handbook, National Imagery Transmission Format Standard (NITFS)*, 12 October 1994.

B. MIL-STD-2500A. *National Imagery Transmission Format (Version 2.0)*, 12 October 1994.

C. MIL-STD-2045-44500. *Tactical Communications Protocol 2 (TACO2) For the NITFS*, 18 June 1993 and *Notice 1*, 29 July 1994.

D. MIL-STD-2301. *Computer Graphics Metafile (CGM) Implementation Standard for the NITFS*, 18 June 1993 and Notice 1, 12 October 1994.

E. MIL-STD-188-196. *Bi-level Image Compression for the NITFS*, 18 June 1993.

F. MIL-STD-188-197A. *Adaptive Recursive Interpolated Differential Pulse Code Modulation (ARIDPCM) Image Compression for the NITFS*, 18 June 1993.

G. MIL-STD-188-198A. *Joint Photographic Experts Group (JPEG) Image Compression For the NITFS*, 12 October 1994.

H. EIA RS-232-C. *Interface Between Data Terminal Equipment and Data Communication Equipment Employing Serial Binary Data Interchange.*

I. ISO IS 10918-1/CCITT T.81. *Digital Compression and Coding of Continuous-tone Draft Recommendation, Still Images. Part I: Requirements and Guidelines*, July 1992.

J. ISO CD 10918-II. *Digital Compression and Coding of Continuous-tone Still Images, Part II: Compliance testing*, February 1993.

K. JIEO Circular 9214. *Joint/Combined Interface Procedures for Secondary Imagery Dissemination Systems (SIDS) to COMSEC Equipment for Point-to-Point TACO2 Communications*, 28 January 1994.

L. JIEO Technical Interface Specification 9137. *NITFS TACO2 To KY-57/58 Cryptographic Devices.*

M. JIEO Technical Interface Specification 9138. *NITFS TACO2 To KG-84 A & C Cryptographic Devices.*

N. JIEO Technical Interface Specification 9139. *NITFS TACO2 To KY-68 Cryptographic Devices.*

O. JIEO Technical Interface Specification 9140. *NITFS TACO2 To STU-III Cryptographic Devices.*

P. FIPS PUB 10-3. *Countries, Dependencies, Areas of Special Sovereignty, and Their Principle Administrative Divisions.*

Q. FIPS PUB 128. *Computer Graphics Metafile.*

R. JIEO Plan 9000, Supplement 1. *Imagery Information Technology Standards Management Plan (IITSMP), Supplement 1, DOD National Imagery Transmission Format Standards (NITFS) Configuration Management Plan (To Be Published)*.

S. NITF Version 1.1. *National Imagery Transmission Format, Version 1.1* 1 March 1989.

T. NITF Version 1.1, Volume I. *NITF Certification Plan Policy*, January 2, 1990.

U. NITF Version 1.1, Volume II. *NITF Certification Plan Processes and Procedures*, January 2, 1990.

V. MIL-STD-188-199. *Vector Quantization Decompression for the NITFS*, 18 June 1993.

W. *NITFS Tagged Record Extension Register*, *(URL: http://jitc-emh.army.mil/nitf/tag_reg/mast.htm)*

X. *National Imagery Transmission Format Standard Profile for Imagery Archives Extensions (PIAE), version 2.0*, 25 April 1996.

Y. CIO ASD SIA 05950000, version 1.0. *Standards Profile for Imagery Archives,* 20 July 1994.

1-4 APPLICABILITY

The NITFS is the designated standard for the formatting and exchange of digital imagery and imagery-related products between members of the Intelligence Community (IC) as defined by Executive Order 12333, the Department of Defense (DOD) and other Departments or Agencies of the United States Government as governed by Memoranda of Agreement (MOA) with those Agencies and the IC/DOD. Adherence to U.S. Federal and DOD standards is required before a particular system can be employed in joint or combined operations. The DOD Directive 4630.5 states that for purposes of compatibility, interoperability, and integration all command, control, communications, and intelligence (C^3I) systems developed for use by U.S. forces are considered to be for joint use.

1-5 AUTHORITY

The Defense Information Systems Agency (DISA) is the DOD authority for NITFS validation testing. The Director, Central Intelligence (DCI) is the IC authority for mandatory NITFS compliance. The Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD/C^3I) is the DOD authority requiring Secondary Imagery Dissemination Systems (SIDS) compliance with the NITFS. The Central Imagery Office (CIO) is the Certification Authority and provides management oversight for the NITFS CTE Program. The Joint Interoperability Test Command (JITC), an element of the Defense Information Systems Agency (DISA), is the Executive Agent to CIO for execution of the NITFS CTE Program. Figure 1 depicts these organizational relationships.

1-6 DEFINITIONS

For the purpose of this plan, the following terms are defined as stated:

A. CERTIFICATION. A statement attesting to the fact that an imagery system has been verified as meeting NITFS compliance criteria.

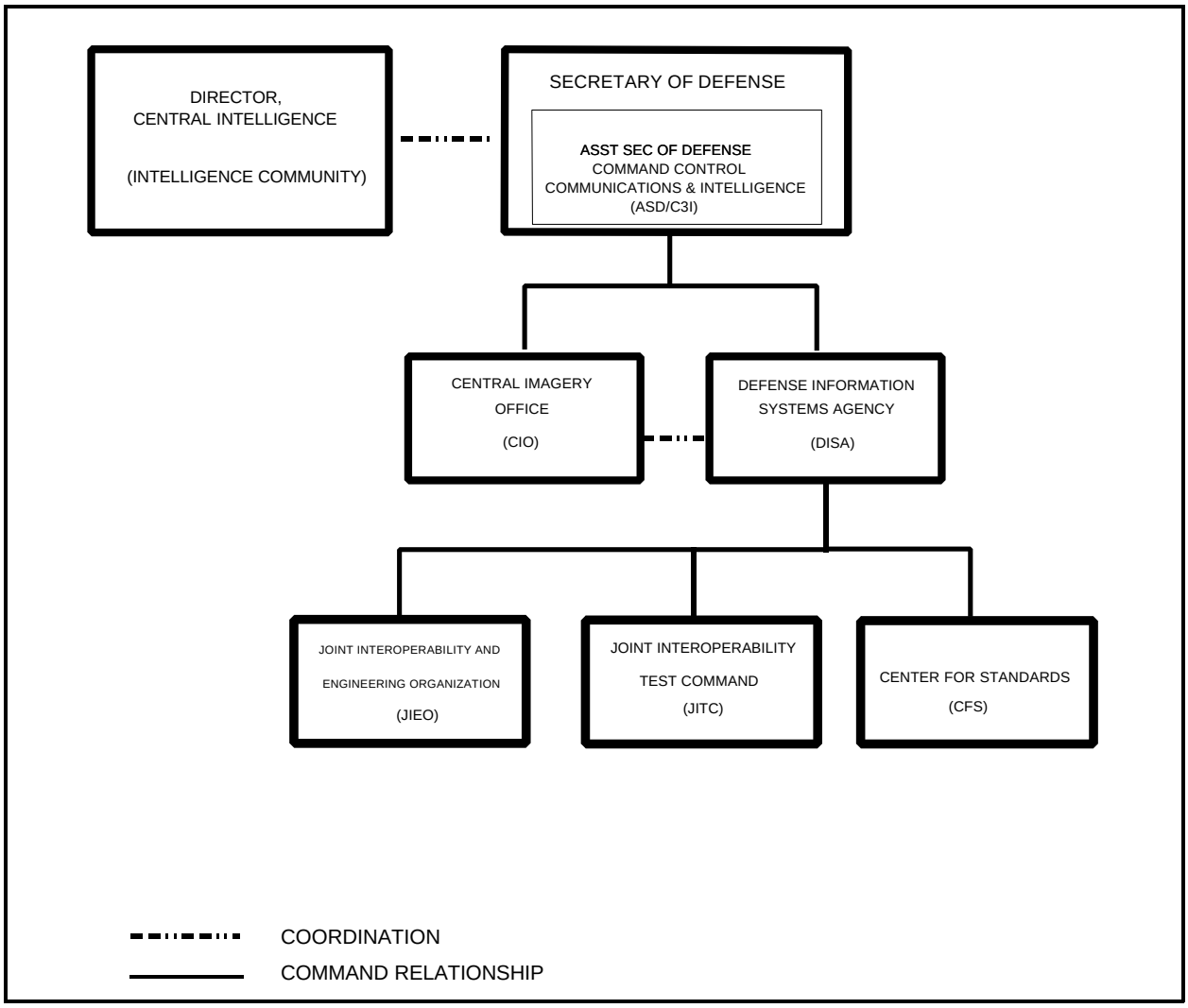


FIGURE 1-1 NITFS CTE PROGRAM ORGANIZATIONAL RELATIONSHIPS

B. CERTIFICATION TEST AND EVALUATION (CTE) FACILITY. The personnel, equipment, data, and facilities for conducting NITFS certification testing.

C. COMMON COORDINATE SYSTEM. The virtual row and column coordinate space against which all NITF file components are ultimately referenced. The location of NITF components with attachment level of zero are referenced to the origin of the Common Coordinate System.

D. CONFIGURATION ITEM. A specific component of hardware and/or software that has an impact on NITFS compliance.

E. CONFIGURATION MANAGEMENT. A discipline applying technical and administrative direction and monitoring to:

1. Identify and document the functional and physical characteristics of a configuration item.

2. Control changes to those characteristics.

3. Record and report change processing and implementation status.

F. DEVELOPMENTAL SYSTEM. A system that has not been approved for use and/or production.

G. DIGITAL IMAGERY SYSTEM. The equipment and procedures used in the collection, storage, display, manipulation, analysis, annotation, exchange and/or transmission of imagery and imagery products.

H. FIELDED SYSTEM. A system that has been approved for use and/or production.

I. NITFS COMPLIANCE. The ability of a system to create and output NITFS compliant files and/or to accept NITFS files and recognize the component parts as prescribed in the NITFS CTE Program Plan.

J. NITFS COMPONENT COMPLIANCE. A statement to the fact that an item (as opposed to a full system) has been tested for compliance to a specific subset of the NITFS compliance criteria.

K. NATIVE MODE. The intrinsic attributes and operational mode of an imagery system. When an imagery system's architecture, design, and/or internal representation for images, symbols, labels, text, and/or other data is not in accordance with the NITFS, its native mode is considered to be other than NITFS.

L. NITF. The National Imagery Transmission Format. The term NITF is often used to describe a file that is formatted according to the NITFS. The term usually inherits the context of the latest version of NITF when the version is not specifically identified.

M. NITFS. The National Imagery Transmission Format Standard (NITFS) is comprised of the suite of standards applicable to the formatting and exchange of digital imagery. The term is used when addressing the overall national imagery standardization effort.

N. NITF VERSION 1.1. The initial version of NITF implemented for which a formal certification testing program was established. Requirements for compliance with NITF Version 1.1 are fully described in the NITF Version 1.1, Volume I, NITF Certification Plan Policy and Volume II, Certification Plan Processes and Procedures.

O. NITF VERSION 2.0. The second version of NITF for which this program plan establishes the formal certification test program.

P. PACK. To create or construct an NITF file within the set of conditions and constraints defined for compliance with the NITFS.

Q. PRIMARY IMAGERY SYSTEM. The equipment and procedures used in the electronic collection, storage, and exchange of original quality, non-exploited imagery and imagery products.

R. SECONDARY IMAGERY DISSEMINATION SYSTEM (SIDS). The equipment and procedures supporting the process of post-collection electronic dissemination of Command, Control, Communications, and Intelligence (C^3I) data, over a time interval ranging from near-real-time to a period of days, at a quality level determined by receiver requirements.

S. SYSTEM UNDER TEST (SUT). A candidate imagery system for NITFS certification for which NITFS compliance testing is being performed.

T. UNPACK. To interpret and make appropriate use of the imagery, data, and associated information contained in an NITF compliant file. In most instances, this includes the capability to accurately display and/or print the contents of an NITF file.

U. WAIVER. A statement attesting to the fact that an entire imagery system or specified NITFS attributes within an imagery system need not comply with certification criteria.

1-7 TEST PROGRAM CONCEPT

The NITFS CTE Program is composed of the NITFS CTE facility, policies, procedures, and administrative and planning actions required to achieve and sustain an imagery system's compliance with the NITFS through testing. The test program supports both the DOD and the IC objectives for ensuring an interoperable format for the exchange of digital imagery products among heterogeneous systems.

A. CENTRAL IMAGERY OFFICE. The CIO oversees the process whereby imagery systems achieve and sustain NITFS compliance through the CTE Program. Initial certification of an imagery system is achieved at the designated test facility, the JITC. Compliance to standards is sustained through recertification testing, as necessitated by changes to the NITFS, changes to (or problems with) certified NITFS configuration items, or when directed by CIO, as long as the imagery system is operational.

B. JOINT INTEROPERABILITY TEST COMMAND. The JITC serves as CIO's executive agent for execution of NITFS test related activities. The JITC has established a NITFS testing facility that supports certification testing of NITFS capable systems, validation testing of proposed additions to NITFS, and other NITFS related test activities.

1-8 TEST PROGRAM POLICIES

The following policies apply to the NITFS CTE Program:

A. GENERAL. All fielded and developmental models of Secondary Imagery Dissemination Systems (SIDS) must achieve compliance with the NITFS. Imagery systems that are not necessarily SIDS, but provide digital imagery dissemination functions, must also achieve compliance with the NITFS.

1. NITF Version 1.1. All currently fielded SIDS must be at least NITF Version 1.1 compliant as verified at the NITFS CTE Facility. Certification test and registration activities for the NITF Version 1.1 certification test program ended 90 days after the start date of the NITFS CTE Program for NITF Version 2.0. However, NITF 1.1 backward compatibility of NITF 2.0 systems continues for two years from the start of the NITF 2.0 test program.

2. NITF Version 2.0. All NITFS imagery systems were to be NITF 2.0 compliant within two years of the January 1994 start date for the NITFS CTE program. ~~All currently fielded imagery systems must be NITF 2.0 compliant or replaced by NITF 2.0 compliant systems within two years of the start date for the NITFS CTE Program.~~ To support interoperability during the two years transition ~~period~~, all NITF 2.0 compliant systems ~~must have a mode of operation that~~ were required to allow for the proper interpretation and use of NITF Version 1.1 formatted files and ~~that limits~~ the creation of ~~an NITF file content to the constraints of~~ NITF Version 1.1 compatible files. ~~Developmental imagery systems must be tested for and achieve NITF 2.0 compliance prior to fielding.~~ The requirement for NITF 2.0 systems to create NITF 1.1 files is now optional. However, due to the extensive existence of NITF 1.1 files, NITF 2.0 systems must continue to properly interpret NITF 1.1 files.

3. Distributed Applications. Some developers may choose to implement systems that distribute NITFS functions across several processing platforms which are networked together. In such cases, the systems will be evaluated as a whole in determining which NITFS attributes and associated certification criteria apply to each component of the system. In any case, provision must be made for the system to fully satisfy the Compliance Level (CLEVEL) criteria for which certification is desired before the system will be registered as NITFS compliant.

4. NITFS Components. Developers may choose to submit components and/or products that implement only a portion of the NITFS system certification requirements for compliance testing and registration. The component will be tested for compliance to the applicable standards. Component registration does not constitute certification nor does it mean that any system which uses the registered component is certified. Use of the registered component may, however, expedite system certification requests.

5. TACO2. All imagery systems must support the Tactical Communications 2 Protocol via either a synchronous or asynchronous communications port.

B. TEST SPONSORSHIP

1. Government. Imagery systems can be sponsored for certification testing by any governmental department, service, or agency.

2. Non-government. Commercial developers or vendors may request NITFS compliance testing without government sponsorship on a fee-for-service basis with the JITC.

C. WAIVERS. The NITFS certification program provides the option for a government sponsor to request either a system waiver or one or more certification test criteria waivers. However, waivers are neither encouraged nor routinely approved.

1. System Waivers. Sponsors desiring an entire system be waived from compliance with the NITFS must submit a request through the NITFS CTE Facility to the CIO. These waivers are not encouraged and may be requested only by government system sponsors. Unique operational and technical requirements must be presented and validated. See Chapter 3, section 3-5 for system waiver request procedures.

2. Certification Test Criteria Waivers. Sponsors desiring waivers of specific NITFS certification test criteria must submit requests directly to the NITFS CTE Facility. If a system has the capability to support a certification test criterion in its native mode, then it cannot be waived for NITFS certification. See Chapter 3, section 3-5 for waiver request procedures.

D. TEST LOCATION. Certification and recertification testing will normally be conducted in the NITFS CTE Facility. Testing at alternate locations may be granted on a case-by-case basis.

E. RECERTIFICATION TESTING. Recertification testing of systems may be directed by the CIO; or may be requested by sponsors and/or developers, depending on conditions such as:

1. Changes to the NITFS certification requirements.

2. Functional problems with NITFS certified imagery systems.

3. Any changes to a configuration item of an NITFS certified system.

1-9 TEST PROGRAM RESPONSIBILITIES

The following paragraphs describe the roles and responsibilities of principal organizations that assist in implementing the NITFS CTE Program.

A. CIO. CIO serves as the Certification Authority and manages the NITFS CTE Program. The CIO directs and provides funding the NITFS CTE Program. Individual system sponsors program and budget for certification testing of imagery systems. CIO assists in the development, promulgation, and utilization of the NITFS. CIO also has the responsibility to:

1. On a fully justified case-by-case basis, grant certification waivers.

2. Approve or disapprove requests for certification test criteria waivers.

3. Issue NITFS certifications based on test results.

4. Provide oversight of the NITFS CTE Program budget.

5. Coordinate the resolution of functional and interoperability problems with NITFS certified systems.

B. JITC. The JITC has responsibility to:

1. Establish, manage, and operate the NITFS CTE Facility.

2. Process certification, recertification, and waiver requests.

3. Arbitrate scheduling conflicts.

4. Plan, schedule, and execute certification and recertification tests.

5. Publish test results and forward recommendations regarding certification. The JITC will attempt to coordinate schedule adjustments for urgent test requests.

6. Maintain and publish a register of NITFS certifications and waivers.

7. Maintain the NITFS CTE Program Plan.

8. Serve as an advisor to the Chairperson of the Imagery Standards Management Committee (ISMC) and the DISA Center for Standards (CFS).

C. TEST SPONSORS. Those sponsoring systems for NITFS certification testing have the following CTE Program Responsibilities.

1. Request NITFS certification and/or recertification of system compliance with the NITFS.

2. Promptly report functional problems experienced with NITFS certified system configuration items to the NITFS CTE Facility.

3. Provide primary and alternate points of contact for system certification matters.

4. Program and budget for the direct costs of certification testing (test fee) of sponsored systems, plus the associated equipment shipping, travel, and per-diem costs.

D. IMAGERY STANDARDS MANAGEMENT COMMITTEE (ISMC). The ISMC, chaired by the CIO, is the configuration management forum for the development and maintenance of the NITFS. The ISMC develops new imagery standards as appropriate. It is the Commanders In Chief (CINCs), Services and Agencies (C/S/A) forum that reviews, analyzes, and evaluates NITFS requirements and proposed changes, and approves or disapproves their incorporation into appropriate standards. Supported by the DISA CFS, it maintains configuration control of the NITFS by deciding standardization issues arising during development, validation, certification, implementation, and operations impacting imagery system interoperability. Details regarding the ISMC are contained in JIEO Plan 9000, Supplement 1.

1-10 TEST PROGRAM FUNDING

A. CERTIFICATION AND RECERTIFICATION FUNDING CONCEPT

1. DOD/IC. Within the DOD/IC, NITFS CTE Program funding is shared by the CIO and imagery system sponsors. The CIO budgets and funds for all operational and maintenance expenses of the NITFS CTE Facility (test equipment, software, test tool development, license fees, etc.). DOD/IC system sponsors support certification testing by providing funding in the form of a fee for each certification and/or recertification test. Recertification test funding may be provided by the CIO if there is a change to the NITFS certification requirements which impacts previously certified DOD sponsored systems.

2. Vendors. The JITC has been designated as a Major Range and Test Facility Base (MRTFB). As a result, commercial developers and vendors may obtain NITFS testing services on a fee-for-service basis from the JITC.

B. PRINCIPAL FUNDING ACTIVITIES

1. System sponsors must transfer a certification test fee to the NITFS CTE Facility prior to testing.

2. Sponsors will fund their own shipping costs, travel, per-diem, and consumable supplies associated with testing at the NITFS CTE Facility.

3. Sponsors will fund the shipping, travel, per-diem, and consumable supplies incurred by the test team when tests are conducted at locations other than the NITFS CTE Facility.

C. CERTIFICATION BUDGETING

The ASD/C^3I previously budgeted for NITF Version 1.1 certification of SIDS that were fielded before 1 July 1989. Funding for NITF 1.1 certification of imagery systems fielded after that date has been shared between ASD/C^3I and system sponsors, as described above. Recertification of NITFS upgrades to previously certified systems will be funded by the ASD/C^3I on a case-by-case basis. Sponsors must budget for NITFS certification of developmental imagery systems through the Planning, Programming, and Budgeting System (PPBS). Sponsors must ensure that a Military Service (or equivalent) Program Element Monitor (PEM) oversees their imagery system throughout its life-cycle to include NITFS certification through the programming and budgeting phases of the PPBS.

1-11 POINTS OF CONTACT

A. NITFS CERTIFICATION PROGRAM MANAGEMENT

National Imagery and Mapping Agency
ST/SES
MSP-24
12310 Sunrise Valley Drive
Reston, VA 20191-3449

Phone: (703) 262-4416
FAX: (703) 264-4401

B. NITFS CERTIFICATION INFORMATION, SCHEDULING DOCUMENTS AND CERTIFICATION REQUEST FORMS

Joint Interoperability Test Command
NITFS Certification Test and Evaluation Facility
ATTN: JTDB
Building 57305 Brainard Road
Fort Huachuca, AZ 85613-7020

NITFS Certification Test and Evaluation Facility
Phone: (520) 538-5458 or 5494
FAX: (520) 538-5257
STU III: (520) 538-5458

C. IMAGERY STANDARDIZATION AND ISMC INFORMATION

DISA/JIEO/Center for Standards
ATTN: JEBCE
10701 Parkridge Boulevard
Reston, VA 22091-4398

Phone: (703) 735-3535
Fax: (703) 735-3256

CHAPTER 2

STANDARDS VALIDATION TESTING

2.1 GENERAL

A. PURPOSE. As changes or additions are nominated to the NITF Standard, they must be validated through testing prior to ISMC approval for implementation and addition to the certification requirements of the NITFS certification test program. Validation testing ensures that the changes or additions to be included in the NITF Standard are technically correct, consistent, complete, and testable.

B. VALIDATION METHODOLOGY. The process for validating a proposed standard or proposed change or addition to an existing standard is as follows:

1. Step 1. The service, functional, and/or performance requirements are fully identified and an appropriate authority ratifies that the requirements are valid. The test objectives and criteria are developed that will be used to ascertain whether the proposed solution satisfies the validated requirements.

2. Step 2. As the proposed standard is being written, compliance test objectives, criteria, and test cases are also written.

3. Step 3. A physical realization of the proposed standard must be implemented. The test procedures and tools needed to conduct compliance testing must also be developed independently of the developer, but in synchronization with the development of the sample implementation.

4. Step 4. The compliance test procedures and tools are used to verify that the sample implementation conforms to the proposed written standard. Based on compliance test results, the sample implementation is modified and re-tested until it adequately conforms with the proposed standard.

5. Step 5. Once the sample implementation has been verified as compliant to the proposed standard, the implementation is evaluated against the objectives and criteria defined in Step 1 to measure how well the proposed standard meets the original service, functional, and/or performance requirements. Upon successful completion of this step, the standard is considered to be validated. A natural outcome of the validation process is the creation of the Means of Testing (MOT), e.g. test procedures and tools, for testing products for compliance with the standard.

2.2 REQUIREMENTS DEFINITION

The technical, functional, and operational performance requirements, as applicable for any nominated changes or additions to the NITF Standard, must be clearly defined and approved for validation testing by the ISMC. The requirements must be stated in sufficient detail to derive validation test objectives and evaluation criteria.

2.3 TEST FUNDING/PLANNING

A. FUNDING. Based on the validation test objectives and evaluation criteria, the NITFS CTE Facility will prepare a cost estimate to plan and conduct the validation test(s) and report the results of the validation. The CIO is responsible for obtaining any additional funding above that already budgeted/programmed for the NITFS CTE Program.

B. PLANNING. The NITFS CTE Facility will prepare the validation test plan for approval by the NITFS ISMC. The ISMC is responsible for establishing the performance requirements for the proposed capability and the criteria for measuring the adequacy of performance. A time-line within the validation test plan will provide milestones that outline the testing period to include the time that the test report should be published.

2.4 TEST EXECUTION

Standards validation testing will be conducted at the JITC NITFS CTE Facility unless an alternate test site is approved by the CIO. The NITFS ISMC is responsible for providing a sample implementation which demonstrates the proposed change to the standard. The JITC will develop the test procedures and MOT required to test compliance to the proposed change or additions. Once the sample implementation has been certified as compliant to the new proposal, it will be tested and evaluated for adequacy of performance in accordance to the performance requirements established by the NITFS ISMC.

2.5 TEST REPORTS

Upon completion of the validation testing, all accumulated test results will be integrated into a final validation test report. The final report will indicate the degree to which the proposed changes or additions met the requirement and performance criteria for validation. The test report will be forwarded to the ISMC with recommendation for addition to the NITF Standard or recommendation for disapproval.

CHAPTER 3

CERTIFICATION TEST AND EVALUATION

3-1 GENERAL

Imagery system sponsors request and sustain NITFS certification using the procedures described in this section. Request and report formats are provided in Appendix B. Procedures are prescribed for the following activities:

A. Initial Certification

B. Recertification

C. Derived Certifications

D. Obtaining a Certification Test Criteria or System Waiver

E. Test Planning

F. Test Execution

G. Test Reporting

H. Reporting Any Modifications To NITFS Configuration Items

I. Reporting Latent Functional Problems with NITFS Certification Systems

3-2 INITIAL CERTIFICATION TESTING ADMINISTRATIVE PROCEDURES

A. TEST SPONSOR. The Test Sponsor will:

1. Prepare and submit the following items to the JITC:

a. A letter, using the organization's letterhead, requesting the desired test.

b. Form CTE-1, Certification Request.

c. Form CTE-2, NITFS System Registration Data.

d. Form CTE-3, NITFS Software Registration Data.

e. Form CTE-4, Alternate Test Site Request (if applicable).

f. One copy of the system's technical manual(s) and operator manual(s).

g. NITFS certification test fee.

2. Submit the test request package to:

Joint Interoperability Test Command
NITFS Certification Test and Evaluation Facility
ATTN: JTDB
Building 57305 Brainard Road
Fort Huachuca, AZ 85613-7020

3. Transfer the NITFS Certification Test fee to:

Joint Interoperability Test Command
NITFS Certification Test and Evaluation Facility
ATTN: JTAF (Ms. Pais)
Building 57305 Brainard Road
Fort Huachuca, AZ 85613-7020

B. JITC. The JITC NITFS CTE Facility will:

1. Review submitted documentation.

2. Provide a point of contact for coordination.

3. Schedule certification testing.

4. Prepare test plan(s).

5. Conduct certification testing.

6. Prepare a test report and provide certification (or failure) recommendations to the CIO.

C. CIO. The CIO will:

1. Review and disseminate the test report to the test sponsor and/or system developer.

2. Prepare and disseminate a letter of certification (or failure) to the test sponsor and/or system developer.

3-3 RECERTIFICATION TESTING ADMINISTRATIVE PROCEDURES

A. TEST SPONSORS. Test sponsors prepare and submit the following items to the JITC:

1. A letter requesting recertification that includes the test sponsor's assessment of the impact on NITFS compliance of the changes made since the last certification or recertification.

2. Form CTE-1, Certification Request.

3. Form CTE-2, NITFS System Certification Registration, noting changes since the last certification or recertification.

4. Form CTE-3, NITFS Software Registration Data, noting changes since the last certification or recertification.

5. Form CTE-4, Alternate Test Site Request (if applicable).

6. One copy of each updated system technical manual(s) and operator manual(s).

7. The recertification test fee if it is determined that a recertification test is required.

B. NITFS CTE FACILITY. The NITFS CTE Facility will:

1. Review the recertification request.

2. Provide a point of contact for coordination.

3. Determine if recertification testing is required.

4. Schedule, plan, and conduct testing, if required.

5. Prepare the test report and forward the recertification recommendations to the CIO.

C. CIO. The CIO will:

1. Approve recertification recommendations.

2. Prepare and disseminate a decision letter of recertification (or failure).

3-4 DERIVED CERTIFICATION ADMINISTRATIVE PROCEDURES

System sponsors may request that certification be granted to a particular system in a derived manner based upon previous certification tests of similar configurations.

A. SYSTEM SPONSORS. In addition to the procedures outlined above for requesting system recertification, system sponsors desiring a derived system certification must also submit the following to the NITFS CTE Facility.

1. A written rationale for requesting the derived certification to include the sponsor's assessment of impact on NITFS functionality of the proposed configuration.

2. A brief report of any internal demonstration testing that has been done to substantiate that the proposed configuration is NITFS compliant.

B. NITFS CTE FACILITY. The NITFS CTE Facility will review the request for a derived certification and determine the level of testing required to certify the system configuration. The level of testing required will generally be one of the following:

1. If the new configuration is determined to be essentially identical to a previously certified system, a recommendation will be made to add the system to the NITFS Certification Register.

2. If the new configuration is slightly different from the previously certified system, an abbreviated test will be performed (over dial-up line when possible). If anomalies are identified during the abbreviated test, a full certification test will be required. Otherwise, a recommendation will be made to add the system to the NITFS Certified System Register.

3. If the new configuration is judged to pose a risk to NITFS compliance, a full certification test will be required.

C. CIO. The CIO will:

1. Approve derived certification recommendations.

2. Prepare and disseminate a decision letter for the derived certification request.

3-5 REQUESTING A CERTIFICATION TEST CRITERIA OR SYSTEM WAIVER

A. GOVERNMENT SPONSORS. Government sponsors submit Certification Test Criteria or System Waiver requests by submitting the following items to the JITC:

1. A letter requesting and justifying the waiver.

2. One copy each of the system's technical manual(s) and operator manual(s).

3. Form CTE-1, Certification Request.

4. Form CTE-2, NITFS System Registration Data.

5. Form CTE-3, NITFS Software Registration Data.

B. NITFS CTE FACILITY. The NITFS CTE Facility will:

1. Review the waiver request documentation.

2. Forward the waiver request with a recommendation to the CIO.

3. Retain a copy of the request and supporting documentation.

C. CIO. The CIO will:

1. Grant or deny Certification Test Criteria Waiver requests.

2. Grant or deny System Waiver requests.

3. Provide the waiver decision by mail.

3-6 TEST PLANNING

The JITC is responsible for developing a comprehensive test plan and associated procedures for fully testing compliance with the certification requirements for the NITFS. The JITC will prepare a test plan supplement for each candidate system that is approved for certification/recertification testing. The test plan supplement will tailor the overall test plan for the specific test criteria, test procedures, and resources needed to conduct the testing for that specific system.

3-7 TEST EXECUTION

A. LOCATION. Certification testing will be conducted at the JITC NITFS CTE Facility unless an alternate test site has been approved by CIO.

B. UNPACKING. All NITFS files received by the candidate system during the test will be displayed and visually examined for completeness and the correct placement of NITFS components. Large image viewing will be done through a random sampling of the full image focusing on areas of the image that have been annotated.

C. PACKING. All NITFS test files created by the candidate system during the test will be examined visually and compared to control test files that have been processed by the NITFS CTE Facility. Image, symbol, label, and text data will be checked for conformance with the standards. ASCII field values will be checked for the appropriate values within the ranges allowed for compliant NITFS files.

3-8 TEST REPORTS

Upon completion of testing, all accumulated results will be integrated into an individual NITFS certification test report. The test report will indicate whether or not the system met the criteria for NITFS certification. Items documented in the report include, but are not limited to: scope, methodology, waivers granted, test limitations, duration of each test, NITFS functional capabilities demonstrated, corrective actions taken during the tests, discrepancies observed, and overall conclusions and recommendations.

3-9 REPORTING MODIFICATIONS OF NITFS SOFTWARE/HARDWARE CONFIGURATION ITEMS

A. SYSTEMS SPONSORS. System sponsors must report hardware and software modifications made to certified systems to the NITFS CTE Facility by submitting the following items:

1. One copy each of the system updated technical manual(s) and operator manual(s).

2. Form CTE-2, NITFS System Registration Data, noting changes since the last submission.

3. Form CTE-3, NITFS Software Registration Data, noting changes since the last submission.

4. A letter describing modifications and assessing the impact on NITFS certification.

B. NITFS CTE FACILITY. The NITFS CTE Facility staff will:

1. Provide a point of contact for coordination.

2. Review the modification description.

3. Determine if recertification testing is required.

4. Make recommendation to the CIO.

5. Schedule and conduct testing, if required.

6. Prepare the test report and forward the recertification recommendation to the CIO.

C. CIO. The CIO will:

1. Approve recertification requests.

2. Prepare and disseminate a letter of recertification as warranted by the results of testing.

3-10 REPORTING LATENT FUNCTIONAL PROBLEMS WITH NITFS CERTIFIED SYSTEMS AND REGISTERED COMPONENTS

A. SYSTEM SPONSORS. When functional or other problems are encountered with the NITFS or a specific implementation or component of the NITFS, system sponsors will report the problem(s) to the CIO using the following procedures:

1. Prepare a letter identifying NITFS problems.

2. Submit two copies of the letter and any other supporting data for review.

B. CIO. The CIO will coordinate the resolution of NITFS related problems.

CHAPTER 4

NITFS REGISTRATION

4-1 GENERAL

A register of NITFS certifications to include any applicable waivers will be maintained by the NITFS CTE Facility. A system register, a software register, and a component register will be maintained.

A. NITFS SYSTEM CERTIFICATION REGISTER. The NITFS System Certification Register identifies those systems that have successfully completed certification testing or have received a derived certification. It also contains the NITFS configuration items (identified by an '*') associated with the certified system. Any change to a system's NITFS configuration item(s) following registration must be reported to the NITFS CTE Facility for assessment of impact on NITFS certification. The contents of the register reflect the information shown in Appendix B, NITFS Form CTE-2.

B. NITFS SOFTWARE REGISTER. The NITFS Software Register will be maintained to expedite derived system certification requests based on software that has previously been demonstrated to properly implement the attributes of the NITFS during a system certification test. The register will identify the software version and minimum hardware configuration items required to support execution of the software. The fact that a software package appears on the NITFS Software Register does not mean that any system which runs the software is NITFS certified. Each time a software package is ported to or loaded on a hardware configuration not listed in the System Certification Register, the system developer/sponsor must submit a request for system certification. The contents of the register reflect the information shown in Appendix B, NITFS Form CTE-3.

C. NITFS COMPONENT REGISTER. The NITFS Component Register provides a means to register components/products that implement a portion of the NITFS system certification requirements, but do not of themselves constitute a complete NITFS capable system. For example, a JPEG compression card, a CGM implementation, a TACO2 implementation, or a specialized Work Station may be tested for compliance with applicable portions of the NITFS and, if compliant, be added to the component register. The fact that a component appears on the NITFS component register does not mean that any system which uses the component is NITFS certified. System developers/sponsors must submit a request for system certification. The contents of the register will be determined by the specifics of those components nominated for registration. Data elements of the component register will be appropriate extractions from the system certification register and the software register.

4-2 REGISTER ACCESS

Copies of the registers are available by contacting the NITFS CTE Facility. Non-government requests for register information must be made in writing on corporate letterhead.

4-3 EXPIRATION OF REGISTRATION

Entries in the system, software, and component registers expire two years from the date of entry. Sponsors must update their registration by submitting a request for recertification. The NITFS CTE Facility will review the requests and determine the degree of testing needed to update the register entry(s). The re-registration fee will be commensurate with the level of effort required to review the request, perform tests as necessary, and update the register entry.

CHAPTER 5

NITFS CERTIFICATION CRITERIA

5-1 GENERAL

A. CERTIFICATION CRITERIA. The NITFS certification criteria are derived from the NITFS documents. NITF file components, attributes, allowable field values, formats, and field lengths are fully described in the NITFS documents. Since the NITFS is very flexible, it has many options, the use of which must be constrained for implementation if file exchange interoperability is to be achieved. The criteria identify the features, capabilities, formats, field values, ranges, and associated boundary conditions of the NITFS against which an implementation is tested for certification.

B. DISTRIBUTED APPLICATIONS. Some developers may choose to implement systems that distribute NITFS functions across several processing platforms that are networked. In such cases, the systems are evaluated as a whole in determining which NITFS features and associated certification criteria apply to each component of the system. Provision must be made for the system to fully satisfy the CLEVEL criteria for which certification is required before the system will be certified.

C. PACK/UNPACK. For the purposes of this program plan, the term "pack" means to create or construct an NITF file within the set of conditions and constraints defined for compliance with the NITFS. The term "unpack" means to interpret and properly display imagery data (images, symbols, and labels) and accurately process associated information contained in a NITF file. In most instances, this includes the capability to accurately display and/or print the contents of an NITF file. Under some circumstances, unpacking a file results in a non-displayed product such as another file of different format resulting from a translation or gateway process.

D. NATIVE MODE RULE. The Native Mode rule refers to the requirement that those systems offering features or attributes in their native mode of operation that directly correlate with elements defined in NITF 2.0, such as symbols and labels, will be required to support those features and attributes in accordance with NITFS.

5-2 NITFS COMPLIANCE LEVELS

Systems which implement NITFS are certified according to their ability to pack and/or unpack various CLEVELs of NITFS formatted files. This concept allows NITFS to be implemented on a wide range of systems with various levels of internal resources while maintaining a baseline level of interoperability between all certified systems. A system may be certified as having a pack-only capability, an unpack-only capability, or both a pack and unpack capability depending on the fielding intent and desire of the system sponsor. A summary of the attributes of each CLEVEL is listed in TABLE 5-1. TABLE 5-1 is an overview summary; the specific attributes and certification tests requirements are described in the remainder of this chapter.

5-3 COMPONENTS OF NITFS COMPLIANCE

Systems must provide a means for exchanging (both transmit and receive) files using the TACO2 protocol, even if they have pack only or unpack-only capabilities. The specific field values, ranges, and boundary conditions of the NITF file format required for certification testing are identified in Appendix C. The specific test conditions for ARIDPCM Compression, Bi-Level Compression, JPEG Compression, CGM, TACO2, ~~and~~ NITF version 1.1 backward compatibility, and Vector Quantization Decompression are identified in Appendices D, E, F, G, H, ~~and~~ I, *and* J respectively.

TABLE 5-1
NITFS CERTIFICATION CRITERIA SUMMARY

Compliance Level	* 1	2	3	4	5	6
Common Coordinate System Size (Pixels)	0064-1024 V X 0064-1024 H	0064-1024 V X 0064-1024 H	0064-2048 V X 0064-2048 H	0064-4096 V X 0064-4096 H	0064-8192 V X 0064-8192 H	0064-65536 V X 0064-65536 H
Image Blocking	Single	Single	Single and Multiple 32^2, 64^2, 128^2, 256^2, 512^2, 1024^2	Single and Multiple 32^2, 64^2, 128^2, 256^2, 512^2, 1024^2	Single and Multiple 32^2, 64^2, 128^2, 256^2, 512^2, 1024^2	Multiple 32^2, 64^2, 128^2, 256^2, 512^2,1024^2
Monochrome (uncomp)	8 Bits\Pixel With & w/o LUT IMODE = B	8 Bits\Pixel With & w/o LUT IMODE = B	8 Bits\Pixel With & w/o LUT IMODE = B	8 & 16 Bits\Pixel With & w/o LUT IMODE = B	8 & 16 Bits\Pixel With & w/o LUT IMODE = B	8 & 16 Bits\Pixel With & w/o LUT IMODE = B
JPEG (mono)	8 Bit sample IMODE B	8 Bit sample IMODE B	8 Bit sample IMODE B	8 & 12 Bit sample IMODE B	8 & 12 Bit sample IMODE B	8 & 12 Bit sample IMODE B
Color 8 Bit (RGB/LUT) No Compression	No	Single Band W/LUT IMODE=B	Single Band W/LUT IMODE=B	Single Band W/LUT IMODE=B	Single Band W/LUT IMODE=B	Single Band W/LUT IMODE=B
Color 24 Bit (RGB) uncomp	No	Three Bands No LUT IMODE=B,P	Three Bands No LUT IMODE=B,P,S	Three Bands No LUT IMODE=B,P,S	Three Bands No LUT IMODE=B,P,S	Three Bands No LUT IMODE=B,P,S
JPEG (color RGB)	No	8 Bit Sample IMODE=P	8 Bit Sample IMODE=P	8 Bit Sample IMODE=P	8 Bit Sample IMODE=P	8 Bit Sample IMODE=P
JPEG (YCbCr)	No	8 Bit Sample IMODE=P	8 Bit Sample IMODE=P	8 Bit Sample IMODE=P	8 Bit Sample IMODE=P	8 Bit Sample IMODE=P
Bi-Level Image	1bpp Image w/wo LUT	1bpp image w/wo LUT	1bpp image w/wo LUT	1bpp image w/wo LUT	1bpp image w/wo LUT	1bpp image w/wo LUT
Bi-LEVEL Compression	COMRAT= 1D,2DS,2DH IMODE = B	COMRAT= 1D,2DS,2DH IMODE = B	COMRAT= 1D,2DS,2DH IMODE = B	COMRAT= 1D,2DS,2DH IMODE = B	COMRAT= 1D,2DS,2DH IMODE = B	COMRAT= 1D,2DS,2DH IMODE = B

* 01 File < 1,213,000 bytes so that it fits on a 3½ or 5¼ floppy disk.

Note: This Table only provides an overview summary of certification criteria. Proper interpretation of the Table is specified in the text of this chapter. CLEVEL "99" is used to designate an NITF 2.0 file not within the 1 to 6 CLEVEL definition.

TABLE 5-1 (Cont)
NITFS CERTIFICATION CRITERIA SUMMARY

Compliance Level	* 1	2	3	4	5	6
VQ Compression	4x4 Kernel 4 table w/wo masking	4x4 Kernel 4 table w/wo masking	4x4 Kernel 4 table w/wo masking	4x4 Kernel 4 table w/wo masking	4x4 Kernel 4 table w/wo masking	4x4 Kernel 4 table w/wo masking
VQ Monochrome	w/wo LUT IMODE = B	w/wo LUT IMODE = B	w/wo LUT IMODE = B	w/wo LUT IMODE = B	w/wo LUT IMODE = B	w/wo LUT IMODE = B
VQ 8-bit color	No	with LUT IMODE = B	with LUT IMODE = B	with LUT IMODE = B	with LUT IMODE = B	with LUT IMODE = B
Inset Image Overlays	0-4	0-4	0-19	0-19	0-19	0-19
Symbols	0-100	0-100	0-100	0-100	0-100	0-100
Aggregate Size	128 Kbyte max	128 Kbyte max	0.5 Mbyte max	1 Mbyte max	1 Mbyte max	1 Mbyte max
Bit Map Symbol Colors (1 BPP)	N,K,W	N,K,W,R,O,B,Y	N,K,W,R,O,B,Y	N,K,W,R,O,B,Y	N,K,W,R,O,B,Y	N,K,W, R,O,B,Y
Object Symbols	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed
CGM SYMBOLS	PREFERRED	PREFERRED	PREFERRED	PREFERRED	PREFERRED	PREFERRED
Labels 1-320 characters each; color options same as for Bit-map Symbols	0-100 2,048 char max	0-100 2,048 char max	0-100 2,048 char max	0-100 2,048 char max	0-100 2,048 char max	0-100 2,048 char max
Text	0-5 Files 100,000 chars max. aggregate	0-5 Files 100,000 chars max. aggregate	0-32 Files 100,000 chars max. aggregate	0-32 Files 100,000 chars max. aggregate	0-32 Files 100,000 chars max. aggregate	0-32 Files 100,000 chars max. aggregate
Controlled Tags	Controlled tags may appear in the following fields: XHD, IXSHD, SXSHD, LXSHD, TXSHD, and "Controlled Extensions" DES regardless of CLEVEL.					
Registered Tags	Registered tags may appear in the following fields: UDHD, UDID, and "Registered Extensions" DES regardless of CLEVEL.					
Data Extension Segment	FUTURE USE Only for Systems that require use.	FUTURE USE Only for Systems that require use.	FUTURE USE Only for Systems that require use.	FUTURE USE Only for Systems that require use.	FUTURE USE Only for Systems that require use.	FUTURE USE Only for Systems that require use.
Reserved Segment	FUTURE USE Only for Systems that require use.	FUTURE USE Only for Systems that require use.	FUTURE USE Only for Systems that require use.	FUTURE USE Only for Systems that require use.	FUTURE USE Only for Systems that require use.	FUTURE USE Only for Systems that require use.
TACO2	ALL SYSTEMS MUST SUPPORT NITF FILE EXCHANGE USING TACO2 PROTOCOL					

* 01 File < 1,213,000 bytes so that it fits on a 3½ or 5¼ floppy disk.

Note: This Table only provides an overview summary of certification criteria. Proper interpretation of the Table is specified in the text of this chapter. CLEVEL "99" is used to designate an NITF 2.0 file not within the 1 to 6 CLEVEL definition.

5-4 NITFS CERTIFICATION TEST FUNCTIONAL REQUIREMENTS

A. NITF PACK. A system must be able to pack NITF compliant files within the constraints of the CLEVEL file types for which certification is desired. A system must at least support packing the NITFS CLEVEL attributes corresponding with those available in its native mode of operation. For example, if the system supports annotation using symbols in its native mode, it must support symbol annotation according to the NITFS. If a system has an image capture or input device, it must support the CLEVELs of the image size(s) that can be captured. Additionally, it must support the maximum boundary conditions for the supported CLEVEL. Systems applying for CLEVEL 2 and above will be required to exchange imagery with lower level systems. Large images must be packed into lower CLEVEL files through either sub-sampling the image, which shrinks it down to the appropriate size, or cutting out the desired portion of that image. The system is not required, however, to implement all NITF attributes available at any particular CLEVEL. For example, some systems do not support the creation of bit-mapped symbols when packing an NITF file but must unpack and display bit-mapped symbols. The set of pack features implemented is somewhat at the discretion of the system sponsor. It is the responsibility of those acquiring or intending to use a particular system to ensure that the needed packing features are present. Whatever set of features are implemented, they must be done within the constraints of the appropriate CLEVEL and will be thoroughly tested. An operator that generates an NITF file must have a means to ensure that the file generated meets the specific level intended and does not exceed the boundary conditions for that CLEVEL file type.

B. NITF UNPACK. A system must be able to unpack any NITF compliant file at the CLEVEL for which certification is desired. The system certification for unpack must be equal to or greater than its CLEVEL for packing. It must also unpack any NITF file packed at a lesser level. Hence, there is a stringent requirement for an unpacker to be robust enough to handle all NITF file features (even if it can't pack the feature) that may be invoked by any packing system of equal CLEVEL or below. A system attempting to unpack a file packed at a higher CLEVEL may do its best to properly interpret and use the file. If the interpretation fails, the system must alert the system operator of the event and must not adversely disrupt its operation (such as requiring a re-boot or re-initialization of the system) without alerting the operator of the potential for disruption of operation.

C. INTEROPERABLE MODE. All digital imagery systems must be capable of performing the basic NITFS file and/or message processing functions associated with each lower CLEVEL below that to which it is certified. All systems must be able to unpack any lower level compliant NITF file. All systems must be able to pack an NITF file of each CLEVEL below which it is certified. The system must pack NITF files at each lower CLEVEL with contents that do not exceed the boundary conditions for each respective CLEVEL. All NITF files must be marked at the lowest CLEVEL that supports unpacking of the file, regardless of the maximum CLEVEL capability of the packing system.

D. COMMON COORDINATE SYSTEM SIZE. One of the differentiators between CLEVELs in TABLE 5-1 is the Common Coordinate System size constraint. These constraints define the boundary rectangle of the combined displayable elements (images, symbols, and labels) contained within an NITF file for each respective CLEVEL. All pack capable systems must constrain the size and location of displayable elements within the boundary of the respective CLEVEL of the file being packed. All unpack capable systems

must support the full extent of the Common Coordinate System size of the CLEVELs for which certification is sought.

E. JPEG COMPRESSION. All systems must support JPEG compression/decompression using at least the Discrete Cosine Transform (DCT), Huffman Entropy Encoding, and 8-bit precision mode of operation. Systems supporting CLEVEL 4, 5, and 6 must also compress/decompress at a 12 bit precision mode of operation. Systems must support the use of restart markers in the compressed data.

F. BI-LEVEL COMPRESSION. All unpack capable systems must support unpacking Bi-Level Group Three compression/decompression using the Huffman Entropy Encoding. They must support unpacking in all three modes: One-Dimensional coding, Two-Dimensional coding with standard vertical resolution, and Two-dimensional coding with high vertical resolution.

G. ARIDPCM COMPRESSION. The use of ARIDPCM compression is limited to NITF 1.1 formatted files. All unpack capable systems must support decompression of ARIDPCM compressed images contained in NITF 1.1 formatted files.

H. VQ DECOMPRESSION. Support of VQ decompression is not mandatory; however, if implemented, the system must comply with the specifications and guidance contained within this document.

I. CGM SYMBOLS. All systems must support unpacking NITF files that contain CGM metafiles. Those systems that support annotation using symbols in their native mode must support packing of CGM symbols.

J. BIT-MAPPED SYMBOLS. All systems must support unpacking NITF files that contain bit-mapped symbols.

K. MONOCHROME. All systems must support unpacking monochrome images. Files which are CLEVEL 1 will contain only monochrome components.

L. COLOR. All systems supporting CLEVEL 2 and above files must unpack color components (images, symbols, and labels). Those systems which support file CLEVEL 2 and above that are native mode monochrome only systems must translate color components into shades of gray for display.

M. TACO2. All systems must provide a means for exchanging files using the TACO2 protocol as well as demonstrate the capability to configure TACO2 parameter settings. All systems must support and demonstrate point-to-point and Secure Telephone Unit-3rd. generation (STU-III) capability.

N. COMMUNICATIONS CHANNELS. All systems, and/or components within a system, must support the exchange of NITF files across whatever standard (ANSI, ISO, FIPS, Commercial, etc) communication channel/protocol that is provided with the system/component. The file exchange capability must be supported between components within the system as well as between systems.

O. PHYSICAL EXCHANGE MEDIA. Systems with exchangeable media capability, (e.g. magnetic disk, tape, optical disk, etc.) must be able to exchange NITF files via the media.

P. NITF 1.1 FILES. All NITF 2.0 unpack capable systems must be able to unpack any NITF version 1.1 minimum compliant file (no waivers) as defined in the NITF Version 1.1 Volume I, NITF Certification Plan Policy, January 2, 1990, and Volume II, NITF Certification Plan Processes and Procedures. All pack capable systems may optionally support the capability to pack NITF files within the minimum constraints of NITF Version 1.1, but do not necessarily need to implement the waivable functions under the NITF 1.1 certification program (e.g., symbol, labels, text, display/attachment levels, and imagery less than 8 bits-per-pixel). TABLE 5-2 lists the basic NITF 1.1 message processing functions for receive (unpack) capable systems. TABLE 5-3 lists the functions for a transmit (pack) capable system. See Appendix I, Message Constraints for Minimum NITF 1.1 Compliance.

TABLE 5-2
NITF VERSION 1.1 FUNCTIONS FOR RECEIVE (UNPACK)

FUNCTION	WAIVABLE?	
	YES	NO
M Receive any minimum compliant NITF message from another system		X
M Decompress/expand ARIDPCM compressed imagery		X
M Unpack imagery from NITF into the native mode format		X
M Unpack symbols from NITF into the native mode format		X
M Unpack labels from NITF into the native mode format		X
M Unpack text files from NITF into the native mode format		X

TABLE 5-3
NITF VERSION 1.1 FUNCTIONS FOR TRANSMIT (PACK)

FUNCTION	WAIVABLE?	
	YES	NO
M Compress imagery using the ARIDPCM algorithm	X	
M Pack imagery into the specified NITF fields		X
M Pack bit-mapped symbols into the specified NITF fields	X	
M Pack labels into the specified NITF fields	X	
M Pack text files into the specified NITF fields	X	
M Transmit minimum compliant NITF files to another System		X

5-5 NITF 2.0 FILE FORMAT CRITERIA - GENERAL

A. All information, including numbers, contained in the NITF header and sub-header fields must be given in the printable ASCII character set [space (32) through tilde (126)] with eight bits (one byte) per character, with the exception of the Label Text Color (LTC) and the Label Background Color (LBC) fields in the Label sub-header, which will be Hexadecimal.

B. All length sizes or character counts given in header and sub-header fields must specify the number of eight-bit bytes.

C. All data in fields designated as "Alphanumeric" must be left justified and padded with spaces as necessary to fill the field.

D. All data in numeric fields must be right justified and padded with leading zeroes as necessary to fill the field.

E. All required fields must be present and must contain valid data.

F. All optional fields must be present, but may or may not contain valid data at the discretion of the operator. In the absence of valid data, optional numeric fields must be filled with zeroes; optional alphanumeric fields must be filled with spaces.

G. Conditional fields are present only if indicated by the value of one or more preceding fields. If a conditional field is present, it must contain valid data.

H. Coordinates for image, symbol, and label data types must be given as an ordered pair (r,c), where the first number (r) indicates the row and the second number (c) indicates the column of the pixel. The positive row axis is oriented 90 degrees clockwise relative to the positive column axis. Each data type's location coordinates (r,c) identify the

location of its origin (0,0) point relative to the location coordinates of the data type item to which its attached.

I. Data types must be placed following the NITF header fields in the following order: image(s), symbol(s), label(s), text, data extension segment(s), reserved extension segment(s). If one or more items of a given data type is included, each item must be preceded by the corresponding sub-header. If a data type is omitted, no sub-header for that data type will be included.

J. Each NITF structure contains no more than one base image, and if present, must be defined in the first image sub-header. All other image, symbol, and label sub-headers define overlays to the first image or to other overlays.

K. File sizes for CLEVEL 1 files must not exceed 1,213,000 bytes. ~~File sizes for CLEVEL 1 files must not exceed 1,213,000 bytes and CLEVEL 6 files cannot exceed 2 Gbytes.~~

L. For CLEVEL 6, unpack capable systems must at least be able to unpack files with file sizes up to and including 2 Gigabytes minus 1 byte (2147483647 bytes). Systems capable of packing CLEVEL 6 files greater than 2 Gbytes may, as an option, also have the capability to split the file (file segmentation) for recipients which are limited to unpacking less than 2 Gbyte files.

1. File Segmentation. File segmentation will be at up to 27 H x 37 V blocks for the primary piece with the overflow going into the subsequent file(s). Upon receipt, the receiver can mosaic the files as required to present a seamless image to the user.

2. File Naming. When a file naming convention is used which identifies "FAF blocks," the file names of the segmented image will indicate the FAF blocks at which the image was split.

3. Reduced Resolution Data Sets. When produced, reduced resolution data sets (i.e., RI through R7) will consist of a single file for each data set aligned with the original (un-segmented) image (R0).

5-6 BASE IMAGE CRITERIA

A. LEVEL 1. All systems must support CLEVEL 1 file structures:

1. Unpack. The system must be able to unpack NITF files containing a monochrome (shades of gray) base image comprised of 0064-1024 pixels by 0064-1024 pixels formatted as follows:

a. Single band

b. Single block

c. One and eight bits-per-pixel

d. With and without a Look-Up Table (LUT). (The system does not have to make use of the LUT, but must otherwise handle the file).

e. JPEG compressed (eight bits-per-pixel)

f. Bi-Level compressed (one bit-per-pixel)

g. VQ compressed (8 bits-per-pixel)

2. Pack. The system must be able to pack NITF files of CLEVEL 1 containing a monochrome base image with no more than 1024 pixels by 1024 pixels (eight bits-per-pixel). The system may optionally pack one bit-per-pixel images. The system must support eight bit precision JPEG compression. The system must insure that the operator cannot create CLEVEL 1 files that exceed the maximum unpack boundary conditions for CLEVEL 1 files. Recompression of decompressed VQ images is prohibited; however, a decompressed VQ image may be packed in its uncompressed state (NC) or in its original compressed form (C4 or M4).

B. LEVEL 2. For those systems that support CLEVEL 2 file structures:

1. Unpack. The system must be able to unpack NITF files containing a base image comprised of 0064-1024 pixels by 0064-1024 pixels formatted as follows:

a. Monochrome, single band, single block, one and eight bits-per-pixel with and without a LUT, compressed and uncompressed.

b. Color (8-bit), single band Red-Green-Blue (RGB) with LUT, single block, eight bits-per-pixel, with three LUTs, uncompressed.

c. Color (24-bit), three bands (RGB), single block, eight bits-per-pixel in each band, without LUTs, JPEG compressed and uncompressed image data ordered as follows:

(1) Band Non-Interleaved by Pixel (uncompressed).

(2) Band Interleaved by Pixel (uncompressed and compressed).

d. Color (24-bit), three bands (YCbCr), single block, eight bits-per-pixel in each band, without LUTs, JPEG compressed image data ordered as Band Interleaved by Pixel.

e. Bi-level compressed (one bit-per-pixel).

f. VQ compressed (8 bits-per-pixel).

2. Pack. The system must be able to pack NITF files of CLEVEL 1 with monochrome images. If the system supports color in its native mode, it must be able to pack NITF files of CLEVEL 2 with at least one of the color image format options identified above for the unpack criteria. When packing a color image using JPEG compression, only

Image Mode (IMODE) P is required. The system may optionally pack one bit-per-pixel images. The system must ensure that the operator cannot pack a CLEVEL 1 or a CLEVEL 2 file that exceeds the maximum unpack boundary conditions for the respective CLEVEL. Recompression of decompressed VQ images is prohibited; however, a decompressed VQ image may be packed in its uncompressed state (NC) or in its original compressed form (C4 or M4).

C. LEVELS 3-5. For those systems that support CLEVEL 3, 4, and/or 5 file structures:

1. Unpack. The system must be able to unpack NITF files containing a single blocked base image and files containing multi-blocked base image comprised of the applicable pixel size ranges for each respective CLEVEL. For multi-blocked images, the system must support block sizes of 32^2, 64^2, 128^2, 256^2, 512^2, and $1K^2$. The pixel size ranges for each CLEVEL are:

0064-2048 pixels by 0064-2048 pixels for CLEVEL 3
0064-4096 pixels by 0064-4096 pixels for CLEVEL 4
0064-8192 pixels by 0064-8192 pixels for CLEVEL 5

Images are formatted as follows:

a. Monochrome, single band, single and multiple blocks, one and eight bits-per-pixel with and without a LUT, compressed and uncompressed. In addition, CLEVEL 4 and 5 will support 12 bits-per-pixel and 16 bits-per-pixel. For 16 bits-per-pixel (NBPP=16):

(1) Eleven significant bits, right justified and left bits filled with zeros.

(2) Twelve significant bits, right justified and left bits filled with zeros.

(3) Thirteen significant bits, right justified and left bits filled with zeros.

(4) Fourteen significant bits, right justified and left bits filled with zeros.

(5) Fifteen significant bits, right justified and left bit filled with a zero.

(6) Sixteen significant bits.

b. Color (8-bit), single band RGB with LUT, single and multiple blocks, eight bits-per-pixel, with three LUTs, uncompressed.

c. Color (24-bit), three bands (RGB), single and multiple block, eight bits-per-pixel in each band, without LUTs, JPEG compressed and uncompressed, image data ordered as follows:

(1) (B) Band Interleaved by Block.

(2) (P) Band Interleaved by Pixel.

(3) (S) Band Sequential (Only valid for images with multiple blocks and multiple bands).

d. Color (24-bit), three bands (YCbCr), single block, eight bits-per-pixel in each band, without LUTs, JPEG compressed image data ordered as Band Interleaved by Pixel.

e. Bi-level compressed (one bit-per-pixel).

f. VQ compressed (8 bits-per-pixel).

2. Pack. The system must be able to pack NITF files with either a monochrome image or a color image (if color capable in native mode, must be color capable in NITF mode) that does not exceed the maximum pixel size and blocking constraints of the respective CLEVEL. When packing a color image using JPEG compression, only IMODE P is required. The system may optionally pack one bit-per-pixel images. The system must ensure that the operator cannot create CLEVEL 1, CLEVEL 2, CLEVEL 3, CLEVEL 4, or CLEVEL 5 files that exceed the maximum unpack boundary conditions for the respective CLEVEL. Recompression of decompressed VQ images is prohibited; however, a decompressed VQ image may be packed in its uncompressed state (NC) or in its original compressed form (C4 or M4).

D. LEVEL 6. For those systems which support CLEVEL 6 file structures:

1. Unpack. The system must support block sizes of 32^2, 64^2, 128^2, 256^2, 512^s and, $1K^2$ comprised of the applicable pixel size range (up to 64k x 64k) and formatted as follows:

a. Monochrome, single band, multiple blocks, compressed and uncompressed one-bit-per-pixel, eight bits-per-pixel, 12 bits-per-pixel and when 16 bits-per-pixel:

(1) Eleven significant bits, right justified and left bits filled with zeros.

(2) Twelve significant bits, right justified and left bits filled with zeros.

(3) Thirteen significant bits, right justified and left bits filled with zeros.

(4) Fourteen significant bits, right justified and left bits filled with zeros.

(5) Fifteen significant bits, right justified and left bit filled with a zero.

(6) Sixteen significant bits.

b. Color (eight-bit), single band RGB with LUT, single and multiple blocks, eight bits- per-pixel, with three LUTs, uncompressed.

c. Color (24 bit), three bands (RGB), multiple block, eight bits-per-pixel in each band, without LUTs, JPEG compressed and uncompressed, image data ordered as follows:

(1) (B) Band Interleaved by Block.

(2) (P) Band Interleaved by Pixel.

(3) (S) Band Sequential (Only valid for images with multiple blocks and multiple bands).

d. Color (24 Bit), three bands (YCbCr) multiple blocks, eight bits-per-pixel in each band, without LUTs, JPEG compressed image data ordered as Band Interleaved by Pixel.

e. VQ compressed (8 bits-per-pixel)

2. Pack. The system must be able to pack NITF files with either a monochrome image or a color image (if native mode is color, it must do color in NITF) that does not exceed the maximum pixel size and blocking constraints of CLEVEL 6. When packing a color image using JPEG compression, only IMODE P is required. The system may optionally pack one bit-per-pixel images. The system must ensure that the operator cannot create CLEVEL 1 through CLEVEL 6 files that exceed the maximum unpack boundary conditions for the respective CLEVEL. Recompression of decompressed VQ images is prohibited; however, a decompressed VQ image may be packed in its uncompressed state (NC) or in its original compressed form (C4 or M4).

5-7 IMAGE OVERLAY CRITERIA

A. For CLEVELS 1 and 2, the SUT interprets files with up to five images (one base image plus four overlay images).

B. For CLEVELS 1 and 2, the SUT does not generate files which have more than five images (one base image plus four overlay images).

C. For CLEVELS 3 through 6, the SUT interprets files with up to 20 images (one base image plus 19 overlay images).

D. For CLEVELS 3 through 6, the SUT does not generate files which have more than 20 images (one base image plus 19 overlay images). However, higher level systems must be able to create compliant files that are downward compatible.

E. The SUT interprets files where pixel image overlays are no greater than the total pixel count of the common coordinate system size.

F. The SUT does not generate files wherein the total pixel count of the image overlays exceeds the total pixel count of the common coordinate size.

G. Image overlays to the base image are properly positioned according to the coordinates identified in the image sub-headers.

H. Image overlays conform to the monochrome, color, bits-per-pixel, blocking interleave mode and compression criteria established for base images.

5-8 IMAGE COMPRESSION CRITERIA, JPEG

A. The SUT supports the Sequential DCT based modes of compression using Huffman Entropy encoding. The image compression field of the image sub-header is set to C3 when the image has been compressed using JPEG.

B. The SUT supports eight bit source sample precision for all CLEVELs. ~~For CLEVELs 1-3 it may optionally support 12 bit source sample precision.~~ CLEVELs 4 through 6 must support 12 bit precision. If the source sample precision is two-seven bits, then the data must be converted to eight bits. If the source sample precision is 9-11 or more than 12 bits, the data must be converted to 12 bits-per-pixel for compression.

C. The encoder must generate the abbreviated interchange format as a minimum. Optionally, it may also generate the full interchange format.

D. For monochrome imagery and color (RGB) imagery compressed as RGB, the quantized DCT coefficient accuracy from the DCT based encoder is within +/- 1 for each coefficient, when compared to reference test data created from a double precision reference encoder. (ISO CD 10918-2 Digital Compression and Coding of Continuous-tone Still Images, Part II: Compliance Testing).

E. Once the criteria in paragraph 5-~~7~~8 D has been met, RGB color test images transformed into YCbCr color space and JPEG encoded by the SUT must have the same general appearance when decoded and displayed as the test images which were encoded, decoded, and displayed in RGB color space by the SUT.

F. The decoder interprets the full interchange format.

G. The decoder interprets the abbreviated interchange format.

H. For monochrome and color (RGB) imagery compressed as RGB, the output of the DCT based decoder, when passed through a reference Forward DCT (FDCT) and Quantizer, is accurate to within +/- 1 for each coefficient, when compared to reference test data created from a double precision reference decoder. (ISO Draft CD 10918-2 Digital Compression and Coding of Continuous-tone Still Images, Part II: Compliance Testing).

I. Once the criterion in paragraph 5-~~7~~8 H has been met, JPEG encoded YCbCr test images decoded and displayed by the SUT must have the same general appearance as the RGB equivalent compressed images when decompressed and displayed in RGB color space by the SUT.

J. Default Quantization Tables (Q-Tables) are not required in the compressed data stream generated by the encoder.

K. The decoder makes use of Q-Tables when included in the data stream.

L. The SUT supports default Q-Tables, Q1 through Q5, for data type 0 and for future image data types, as tables are approved by the NITFS ISMC.

M. The SUT makes use of the Binary Digits (BITS) and Huffman Values (HUFFVALS) tables included in the JPEG-header.

N. If the SUT is capable of generating custom BITS and HUFFVALS tables, they are generated in accordance with Appendix C of the JPEG MIL-STD-188-198.

O. If the Define Q-Table (DQT) marker is not present in the compressed data, information from the Compression Rate (COMRAT) field in the NITF image sub-header will be used to determine the appropriate Q-Table.

P. If the DQT marker is present in the compressed data, the table specified by the DQT marker takes precedence over any table specified by the COMRAT field in the NITF image sub-header.

Q. If a SUT can generate a custom quantization table, that Q-Table must be in accordance with MIL-STD-188-198.

R. The encoder uses restart marker code(s) in the entropy encoded data file.

S. The entropy decoder must re-synchronize the decompression at the next restart marker when data is corrupted in the entropy encoded file.

T. JPEG entropy decoders shall be able to decode and display a JPEG compressed image in which no more than 10% of the restart intervals in the compressed data stream contain errors. JPEG entropy decoders shall recognize the following as errors:

- Restart Marker appearing too early in the data stream.
- Restart Marker appearing too late in the data stream.
- Restart Marker missing from the data stream.
- Unknown Huffman Code in the data stream.

When the entropy decoder detects any of these errors in the compressed JPEG data stream, the imagery system must identify the corrupted data in the decoded image. ~~replace the decoded image file corrupted data with a pattern so that when the image is displayed, it is apparent that the compressed image data had an~~ error. This can be accomplished by suitable reporting or replacing the corrupted data with a suitable pattern so that when the decoded image is displayed, it is apparent that the compressed data stream had an error. ~~This pattern shall be limited to the RST Interval(s) in which the error occurred. All RST intervals without errors must be decoded and displayed. When the entropy decoder finds that compressed data is corrupted, thus causing image data to be missing, it must pad the~~

~~reconstructed image file with some value so that as the image is displayed, it will be apparent that data was missing.~~

U. The SUT uses default HUFFVALS & BITS tables when not found in the JPEG stream.

~~**V.** If the define Huffman Table Marker is not present in the compressed data, information in the NITF sub-header and the Default Huffman tables is used to decompress the image.~~

5-9 IMAGE COMPRESSION CRITERIA, BI-LEVEL

A. The SUT supports image compression modes of operation as follows:

1. 1D for One Dimensional Coding (Encode is optional; decode is mandatory).

2. 2DS for Two Dimensional Coding, Standard Vertical Resolution, K=2 (Encode is optional; decode is mandatory).

3. 2DH for Two Dimensional Coding, High Vertical Resolution, K=4 (Encode is optional; decode is mandatory).

B. The SUT encoder supports compression of bi-level images with horizontal scan lines containing up to and including 2560 pixels and ~~vertical scan lines~~ containing up to and including 8192 ~~pixels~~ scan lines as constrained by CLEVEL limits.

C. The SUT decoder supports decompression of bi-level images with horizontal scan lines containing up to and including 2560 pixels and ~~vertical scan lines~~ containing up to and including 8192 ~~pixels~~ scan lines as constrained by CLEVEL limits.

D. Images compressed by the SUT encoder must compare bit-by-bit with the same images compressed by the test facility's reference encoder.

E. Images decompressed by the SUT decoder must compare bit-by-bit with the same images decompressed by the test facility's reference decoder.

F. The SUT must support the use of synchronization and Huffman codes.

G. Bi-Level compressed images are always a single block; multiple blocks are not allowed with bi-level compression.

H. When compressing imagery, the SUT encoder must convert the default bit representation of "0" black/"1" white to "1" black/"0" white prior to applying the compression algorithm.

I. When decompressing imagery, the SUT decoder must convert the bit representation "1" black/"0" white to "0" black/"1" white.

J. When LUTs are used, encoders shall base bi-level LUTs prior to bit conversion and compression. Decoders shall apply bi-level LUTs to the data stream after decompression and bit conversion.

5-10 IMAGE COMPRESSION CRITERIA, ARIDPCM

The use of ARIDPCM image compression is limited to NITF 1.1 formatted files. The system must preclude the use of ARIDPCM when creating NITF 2.0 formatted files.

A. The system may optionally pack minimum compliant NITF 1.1 files containing imagery it has compressed using at least one rate of the ARIDPCM algorithm (4.50, 2.30, 1.40, and 0.75). The system will be tested for compliance to the ARIDPCM algorithm for all compression rates that the system claims to use.

B. The system must interpret and render minimum compliant NITF 1.1 files containing imagery that have been compressed using the ARIDPCM algorithm at all allowed rates (4.50, 2.30, 1.40, and 0.75).

5-11 SYMBOL CRITERIA, BIT-MAPPED SYMBOLS

A. A system must be able to interpret and use a file containing 0-100 bit-mapped symbols. The maximum aggregate size of symbols (bit-mapped, CGM, or a combination of both) for CLEVEL 1 and CLEVEL 2 is 131,072 (128 ~~130~~ Kbytes), 524,288 (0.5 Mbytes) for CLEVEL 3, and 1,048,576 (1 Mbyte) for CLEVELS 4, 5, and 6.

B. A system must be able to interpret bit-mapped symbol colors as follows:

CLEVEL	Bits/Pixel	COLOR
1	1	N,K,W
2-6	1	N,K,W,R,O,B,Y

C. If a system in its native mode of operation has the capability to generate bit-mapped symbol annotations, it must support the inclusion of bit-mapped symbols within NITF files that it creates.

D. The system must preclude the generation of an NITF file containing bit-mapped symbols that exceed the maximum interpretation ranges for specific CLEVELs as stated above.

5-12 SYMBOL CRITERIA, CGM SYMBOLS

A. A system must be able to interpret and use a file containing 0-100 CGM symbols. The maximum aggregate size of symbols (bit-mapped, CGM, or a combination of both) for CLEVEL 1 and CLEVEL 2 is 128 ~~130~~ Kbytes, CLEVEL 3 is 0.5 Mbytes, and CLEVELS-4, 5, and 6 is 1 Mbyte.

B. For CGM symbols, the following sub-header field values are not applicable. A system must be able to interpret and use symbols regardless of the field entry values of

these non-applicable fields. The following default values must be used for packing CGM symbols:

FIELD	VALUE	
NLIPS	"0000"	(Number of lines per symbol)
NPIXPL	"0000"	(Number of pixels per line)
NWDTH	"0000"	(Line Width)
NBPP	"0"	(Number of bits-per-pixel)
SCOLOR	" "	(1 space) (Symbol Color)
SNUM	"000000"	(Symbol Number)
SROT	"000"	(Symbol Rotation)
NELUT	"000"	(Number of LUT entries)

C. If a system in its native mode of operation has the capability to generate any type of symbol annotations, it must support the inclusion of CGM symbols within NITF files that it creates.

D. The system must preclude the generation of an NITF file containing CGM symbols that exceed the maximum interpretation ranges for specific CLEVELs as stated above.

5-13 SYMBOL CRITERIA, OBJECT SYMBOLS

A. The system must currently preclude the generation of an NITF file containing object symbols. (This attribute will be added at a future date once fully defined).

B. The system must not be adversely affected when attempting to interpret a file which contains object symbols and must otherwise properly interpret the other legal components of the file (This is to provide for backward compatibility with future systems that will implement object symbols once fully defined).

5-14 LABEL CRITERIA

A. Labels are composed of printable ASCII characters [space (32) through tilde (126)] plus carriage return (10) and line feed (13) characters.

B. Labels are non-destructively overlaid upon one or more images and/or symbols to serve as annotation.

C. Labels are presented as contiguous data, with each ASCII character immediately following the other.

D. Label data begins with the first, or left-most character of the label, followed by subsequent characters, as read from left to right.

E. For multiple line labels, a carriage return (CR) followed by a line feed (LF)(also known as (CR/LF)) is used to delimit lines in the label, where the first character of the next line immediately follows the ASCII line feed character and is placed immediately below the first character of the preceding line.

F. No field delimiters or special characters are used to designate the end of the label data. The label data ends with the last character of the label.

G. When more than one label is included in the file, the last character of the first label is followed by the first character of the second sub-header.

H. All label information must fit within the limits of the Common Coordinate System Size. The SUT must select an appropriate label size to insure that all label information fits within the limits of the defined Common Coordinate System boundaries.

I. The size of a single label is within the range of 1-320 characters.

J. A system must be able to interpret a file containing 0-100 labels where the maximum aggregate size of the labels does not exceed 2,048 (2K) characters.

K. The first pixel of the first line of each label is located at the row and column location designated in the sub-header relative to the origin of the object to which it is attached.

L. A system must be able to interpret combinations of label foreground (text) and background colors as follows:

	Foreground	Background
CLEVEL 1:	White	Transparent
	Black	Transparent
	White	Black
	Black	White
CLEVEL 2 - 6:	White	Black
	Black	White
	Black	Transparent
	White	Transparent
	Red	Transparent
	Orange	Transparent
	Blue	Transparent
	Yellow	Transparent

M. The label font style field is reserved for future use and will be filled with the default value of one space. Receipt of a file with other than a space in this field will not adversely affect the interpretation and use of the file.

N. Systems may use internal default cell width/height values regardless of values included in the label sub-header. A default value of "00" indicates the originator did not include the information and the interpreting system may use its internal defaults. However, the interpreting system must ensure the label data does not extend beyond the boundaries of the Common Coordinate System and that no data is lost from presentation.

O. If a system in its native mode of operation has the capability to generate label annotations, it must support the inclusion of labels within NITF files that it creates. However, the label attribute using the CGM symbol data type may be used vice the label data types.

P. The system must preclude the generation of an NITF file containing labels that exceed the maximum interpretation ranges for specific CLEVELs as stated above.

5-15 TEXT CRITERIA

A. The system must at least read and display text files associated with the text format code for standard ASCII (STA) and Message Text Format (MTF). Although the system must not be adversely affected when attempting to interpret a file which contains text with other format codes (e.g., ~~MTF,~~OTH~~, ...~~), it is not required to read and display the text in the original intended form.

B. For text files formatted as STA:

1. The contents are composed of none other than the following STA characters: Line Feed (10), Form Feed (12), Carriage Return (13), and space (32) through tilde (126).

2. All lines are separated by carriage return/line feed (CR/LF) pairs, where the first character of the next line (if present) immediately follows the line feed character.

3. Text data is presented as a contiguous file, with each permitted STA character immediately following the other.

4. Text data begins with the first, or left-most character of the text, followed by subsequent characters, as read from left to right.

5. No field delimiters or special characters are used to designate the end of the text data.

6. If more than one text file is included in the NITF file, the last character of the first file is followed by the first character of the next sub-header.

C. For text files formatted as MTF the implementation may optionally pass the text data field content to an MTF capable application for further processing.

D. A system must be able to interpret a file containing 0-5 text files for CLEVELs 1 and 2, and 0-32 text files for CLEVELs 3-6. The maximum aggregate size of the text files must not exceed 100K characters.

E. The system must preclude the generation of an NITF file containing text files that exceed the maximum interpretation ranges for specific CLEVELs as stated above.

5-16 DATA EXTENSION SEGMENT CRITERIA

A. ~~The use of Data Extension Segments is not currently being certified. The number of tagged extensions currently approved is not expected to overflow the base image subheader extension area, and there are no approved encapsulated data products at this time. Therefore, files generated by an NITF compliant system must fill the Number of Data Extension Segments (NUMDES) field with "000."~~ When the number of tagged extensions overflow the base subheader extension area, the NITF compliant system must fill the Number of Data Extension Segments (NUMDES) field with the appropriate non-zero value upon generation of a NITF file. Files generated by NITF compliant systems that do not use Data Extension Segments must fill the Number of Data Extension Segments (NUMDES) field with "000." Systems that require the use of Data Extension Segments, shall fill the Data Extension Segments (NUMDES) field, Length of Nth Data Extension Segment Subheader (LDSHnnn), and Length of Nth DES Data Field (LDnnn) with the associated values determined by the length of the DES. Systems that require the use of the Data Extension Segment shall be tested for the generation of the associated data defined by the Data Extension Segment.

B. Upon receipt of a file where the NUMDES field contains a count other than "000," the system must otherwise properly interpret the other legal components of the file. All overflow tags tested within the Data Extension Segment shall be registered with the NITFS ISMC. Systems that require the use of Data Extension Segments shall be tested for the interpretation of the associated data defined by the Data Extension Segment.

5-17 RESERVED EXTENSION SEGMENT CRITERIA

A. ~~Since Reserved Segments are not yet defined in Version 2.0 of NITF, files generated by an NITF compliant system must fill the Number Reserved Extension Segments (NUMRES) field with "000."~~ Files generated by NITF compliant systems that do not use Reserved Extension Segments must fill the Number of Reserved Extension Segments (NUMRES) field with "000." Systems that require the use of Reserved Extension Segments shall fill the Number of Reserved Extension Segments (NUMRES) field, Length of Nth RES Subheader (LRSHnnn), and Length of Nth RES Reserved Field (LRnnn) with the associated values determined by the length of the RES. Systems that require the use of Reserved Extension Segments shall be tested for the generation of the associated data defined by the Reserved Extension Segment.

B. Upon receipt of a file where the NUMRES field contains a count other than "000," the system must otherwise properly interpret the other legal components of the file. Systems that require the use of Reserved Extension Segments shall be tested for the interpretation of the associated data defined by the Reserved Extension Segment. All tested Reserved Extension Segments shall be controlled with the NITFS ISMC.

5-18 OVERLAY AND DISPLAY LEVEL CRITERIA

A. The SUT must support non-destructive overlays. Overlays must not be merged with the base image in a way that precludes them from being separated from it.

B. The SUT must render overlays in the order indicated by their display level, not by their relative position within the NITF structure.

C. The non-transparent pixel value of a higher numbered display level replaces the values of lower numbered display levels when rendered.

D. Overlays must be positioned at the correct row and column relative to the origin of the object to which they are attached.

5-19 ATTACHMENT LEVEL CRITERIA

~~The attachment level of an overlay is equal to the display level of the overlay or base to which it is attached. Display level must always be numerically greater than its attachment level. The image, symbol, or label component in the file having the minimum display level shall have attachment level zero.~~

A. The image, symbol, or label component in the file having the lowest numerical display level shall have attachment level zero and the common coordinate system location of 0,0.

B. SUTs capable of packing overlay elements within a file must support packing the elements with the base element having attachment level 000 and all other elements having attachment levels of 000 or greater. Unpack capable SUTs must support attachment levels over the range of 000 - 998.

C. The attachment level of an overlay element must be equal to the display level of the overlay element or the base element to which it is attached.

D. The display level of an element must always be numerically greater than its attachment level.

E. The SUT must properly display and position all elements based on the specified row and column offset from the item's origin point to which it is attached.

F. As an option, the SUT may maintain the parent-child relationship among its attached elements so that the elements may be treated together as a group for certain operations such as, moving, rotating, and displaying.

5-20 USER DEFINED DATA, REGISTERED TAG CRITERIA

The following criteria pertain to all implementations of the NITFS.

A. Upon receipt of a file which contains information in the user defined data fields, the system must at least properly interpret the other legal components of the ~~NITF~~ file.

B. Only those user defined data tags registered with the NITFS ISMC may be used.

C. Each registered tagged record extension consists of three required fields~~,~~: RETAG, (6 byte unique extension identifier), REL (length of extension in bytes), and REDATA (user-defined data).

D. A sequence of registered tagged record extensions can appear in the ~~NITF header~~ User Defined Header Data field (UDHD) ~~of the NITF file header~~ or any image subheader User Defined Image Data (UDID) field. Registered tags are currently limited to appear only in the image user defined image data field of the base image.

E. A sequence of registered extensions can also appear in a Data Extension Segment (DES) which is designated to contain registered extensions. This condition will be identified by the first three characters of the UDHD or UDID field containing the sequence number of the "Registered Extension" DES into which the tags are placed. ~~When the tagged record extension carries data that is associated with the field as a whole, it should appear in the UDHD field. If the extension carries data associated with an image data item in the field, it should appear in the UDID field of that item if sufficient room is available. Registered tags are currently limited to appear only in the user defined image data field of the base image.~~

F. When the registered tagged record extension carries data that is associated with the file as a whole, it should appear in the UDHD field. If the extension carries data associated with an image data item in the file, it should appear in the UDID field of that item if sufficient room is available. ~~A registered tagged record extension may appear in a Data Extension Segment (Paragraph 5-15) which is designated to contain registered tagged record extensions, but only if sufficient space is not available in the UDHD or a UDID, as appropriate. This feature is currently not to be used.~~

G. A registered tagged record extension must be included in its entirety within the specific UDHD or UDID selected to contain it.

5-21 EXTENDED HEADER, CONTROLLED TAGS CRITERIA

A. General. The following criteria pertain to all implementations of the NITFS.

1. ~~A.~~ Upon receipt of a file which contains information in the extended data fields, the system must at least properly interpret the other legal components of the file.

2. ~~B.~~ Only those controlled tags approved by the ISMC may be used.

3. ~~C.~~ Each registered controlled ~~tagged~~ record extension consists of three required fields~~,~~: CETAG, (6 byte unique extension identifier), CEL (length of extension in bytes), and CEDATA (user-defined data).

4. ~~D.~~ A sequence of controlled tagged record extensions can appear in the Extended Header Data (EHD) field of the NITF file header or in the Extended Sub-header Data field for any standard data type data item in the file. ~~Controlled tags are currently limited to appear only in the image extended sub-header data field of the base image.~~

5. ~~E.~~ A sequence of controlled extensions can also appear in a Data Extension Segment (DES) which is designated to contain controlled extensions~~, but only if space is not available in the appropriate extended data field. This feature is currently not to be used~~. This condition will be identified by the first three characters of the XHD, IXSHD,

SXSHD, LXSHD, or TXSHD field containing the sequence number of the "Controlled Extension's" DES into which the tags are placed.

6. A controlled tagged record extension must be included in its entirety within the specific XHD, IXSHD, SXSHD, LXSHD, TXSHD, or DES selected to contain it.

B. Support Data Extensions (SDE's). The following general criteria apply to those systems which produce NITF files containing SDEs. Production sources that produce NITFS files with SDE's must create these files in compliance with the NITFS and the approved SDE specification(s) appearing on the NITFS Tagged Record Extensions Register.

1. All information, including numbers, contained in SDE tags must be given in the printable ASCII character set [space (32) through tilde (126)] with eight bits (one byte per character.

2. All data in fields designated as "alphanumeric" must be left justified and padded with spaces as necessary to fill the field.

3. All data in numeric fields must be right justified and padded with leading zeroes as necessary to fill the field.

4. All required fields must be present and must contain valid data as defined in the SPID and associated documentation.

5. The implementation must ensure that the correct data from the source data is mapped into the appropriate support data extension(s).

6. The implementation must not allow the inclusion of an extension tag(s) if the information within the extension(s) is not available from the source support data.

7. The implementation will ensure that information included in an extension(s) that is also required in NITF header or image subheader fields is mutually consistent.

C. Profile for Imagery Archives Extensions (PIAE). The following criteria pertain to those systems which support the creation and use of PIAEs. Refer to the NITFS Profile for Imagery Archives Extensions (PIAE) for additional information. Production sources that produce NITFS files with PIAEs must create these files in compliance with the NITFS, NITFS Profile for Imagery Archives Extensions, and Standards Profile for Imagery Archives.

1. All information, including numbers, contained in PIAE tags must be given in the printable ASCII character set [space (32) through tilde (126)] with eight bits (one byte per character.

2. All data in fields designated as "alphanumeric" must be left justified and padded with spaces as necessary to fill the field.

3. All data in numeric fields must be right justified and padded with leading zeroes as necessary to fill the field.

4. All required fields must be present and must contain valid data as defined in the NITFS PIAE.

5. Only archive systems are allowed to enter data into the Access id (ACCESSID) field of the PIAPR tag.

6. When used, PIAE tags shall appear in the following extended data fields or "Controlled Extensions" DES if overflowed:

a. PIAPR tag: XHD of main header; one per file.

b. PIAIM tag: IXSHD of image subheader; one per each image in the file.

c. PIATG tag: IXSHD of image subheader, SXSHD of symbol subheader, LXSHD of label subheader, TXSHD of text subheader; up to 250 per file.

d. PIAPE tag: IXSHD of image subheader, SXSHD of symbol subheader, LXSHD of label subheader, TXSHD of text subheader; up to 250 per file.

e. PIAVA tag: IXSHD of image subheader, SXSHD of symbol subheader, LXSHD of label subheader, TXSHD of text subheader; up to 250 per file.

f. PIAEQ tag: IXSHD of image subheader, SXSHD of symbol subheader, LXSHD of label subheader, TXSHD of text subheader; up to 250 per file.

7. Any system modifying an NITF file will ensure that the FDT field has been updated.

8. As a minimum, systems submitting NITF files to an archive must include a PIAPR tag and a PIAIM tag for each image in the file they create for submission.

9. Receiving Archives:

a. Must review NITF files to ensure they are in compliance with NITFS and PIAE documentation. This will include:

(1) Checking NITF header and subheader data.

(2) Checking PIAE tag data.

(3) Identifying missing tags.

b. When problems with incoming NITF files are identified, the file will be queued for operator review and action.

c. Must archive submitted files that have no format problems without operator interface.

d. Must apply a unique Access ID (ACCESSID) to newly submitted files containing an existing PIAPR tag when the file is new to the archive.

e. Will insert a PIAPR tag if the submitted file is new to the archive and contains no PIAE tags. All required fields will be filled out and an Access ID (ACCESSID) will be assigned.

10. Disseminating Archives:

a. Will ensure that non-NITF formatted files converted to NITF format are in compliance with all applicable NITFS and PIAE requirements.

b. Will ensure NITFS compliance is maintained on output files resulting from data manipulation actions such as pixel subsampling, chipping, decompressing, compressing, etc.

c. Will ensure that files, originally archived as NITF files, have preserved the original data integrity of imagery, symbol, label, text and support data.

5-22 NITF 1.1 CRITERIA

A. Minimum Compliant NITF Field Values and Ranges. The following subset of NITF capabilities has been prescribed to ensure a common level of functionality with systems using NITF version 1.1. Related message parameters are described below.

1. Image/Subimage Parameters. Imagery will be grayscale and may be from 8 x 8 to 512 x 512 pixels, 8 bits-per-pixel. Images may be either compressed or uncompressed using ARIDPCM. Since subimages may be overlaid on a base image, there may be from 0 to 5 images per message. The size of the largest image in the message may be up to 512 columns by 512 rows. The aggregate size of all remaining images within a message must not exceed 50 percent of the base image.

2. Symbol Parameters. Symbols will be bit-mapped and may be 1 to 512 lines of 1 to 512 pixels per line, 1 bit-per-pixel, in white foreground on black background (N), black foreground on transparent background (K), or white foreground on transparent background (W). There may be 0 to 100 symbols per message. The maximum aggregate size of all symbols within a message must not exceed 262,144 bits.

3. Label Parameters. Labels will be in STA between 0 and 320 characters long. They may be white foreground (text) on transparent background, white on black, black on transparent or black on white. There may be 0 to 100 labels per message. The aggregate size of all labels within a message must not exceed 2,000 STA characters.

4. Text Parameters. Text files will be composed of STA characters. There may be 0 to 5 text files per message. The aggregate size of all text files within a message must not exceed 10,000 STA characters.

B. Minimum Compliance Capabilities:

1. Receive (Unpack) Capabilities. An NITF compliant Receive (unpack) capable system must be able to receive and unpack any minimum compliant NITF file.

2. Transmit (Pack) Capabilities. An NITF compliant Transmit (Pack) system must be able to pack and transmit a minimum compliant NITF file which will include selected combinations of:

a. 0 images per message.

b. At least 1 image per message.

c. Compressing imagery with ARIDPCM using at least 1 rate (optional).

d. 0 symbols per message.

e. At least 1 symbol per message, if there is no symbol waiver.

f. 0 labels per message.

g. At least 1 label per message, if there is no label waiver.

h. 0 text files per message.

i. At least 1 text file per message, if there is no text waiver

5-23 USABILITY CRITERIA

The NITFS documents do not currently identify requirements for the usability of systems which implement NITFS. A system can be in technical compliance with the standards, yet not be well suited for use in its targeted user environment. The following usability criteria are based upon observations made during past NITF certification tests. These criteria will be evaluated by the NITFS CTE Facility and will be discussed in the test report, but they will not be considered compliance criteria for certification. The purpose is to raise the sponsor's awareness of human factors considerations. Sponsors are encouraged to provide the NITFS CTE Facility additional usability test criteria that they would like to have evaluated during certification testing of their system.

A. TARGET AUDIENCE DESCRIPTION. The developer has prepared a target audience description for the system and used it in the design and development of the system. An appropriate Human Factors Engineering (HFE) and Safety evaluation has been conducted.

B. OPERATOR'S MANUAL. An up-to-date operator's manual for the system was available at the time of certification testing.

C. CONSISTENT USER INTERFACE. The system has a consistent user interface with the appearance of a single integrated application. There is no perception of needing to exit and enter multiple routines to handle NITF operations. There is no need to enter commands at the operating system prompt once the application is started.

D. HEADER/SUB-HEADER DEFAULTS. The system does not require an operator entry for each and every NITF file header or sub-header field value. It provides

some mechanism for establishing default values and automatic calculation of values where appropriate.

E. HEADER/SUB-HEADER EDIT. The system must not use hard coded header/sub-header defaults that cannot be changed without re-coding and recompiling the program. The system provides edit capabilities for header/sub-header values in a controlled manner depending on the access privilege of different levels of users.

F. SCREEN AND IMAGERY BOARD CORRESPONDENCE. A method is provided to handle the circumstance when the screen or other rendering device does not have the same pixel display capacity as the imagery processing board. There are clear procedures for setting up the appropriate parameters for proper image display. There is some means to alert the operator that the rendered image may be cropped because the display device doesn't handle the full image size as received (when no roaming or panning capability is provided).

G. AUTOMATIC RENDERING. NITF message components are automatically displayed according to the NITF file header values without operator intervention; i.e. the operator is not required to read NITF header values and manually place components of the file for display.

H. DIRECT TEXT ENTRY. The system allows for the entry of text without the operator needing to be aware of special procedures for insuring only the NITFS ASCII set of characters (without special word processing control codes, but with proper CR/LF line terminators) are entered into the NITF file.

I. USER ALERTS. There is some method to alert the operator that text or image comment fields are included within the NITF file being viewed and there is a convenient means to view the components. The operator is alerted to other aspects regarding the file being viewed that are not readily apparent from the image display (such things as: user defined or extended data is included in the file; the image has color components but has been modified for display on a monochrome system; the file is in NITF 1.1 format; security codewords are included in the file headers; particular components could not be properly parsed or interpreted, etc.).

J. AUTOMATIC ASSIST. The system assists the operator in preparing NITF files that do not exceed the established boundary conditions for a specific CLEVEL. There is no excess dependance on operator knowledge or procedures to insure only compliant files are packed.

5-24 TACO2 CRITERIA

A. SUT's TACO2 implementation operates over a point to point channel.

B. The communications port on the SUT operates in either synchronous or asynchronous timing, or both.

C. The TACO2 implementation supports full duplex (FDX), half duplex (HDX), and simplex.

D. The TACO2 implementation supports various baud rates depending upon the timing. For synchronous timing, ~~baud~~ rates 1,200, 2,400, 4,800, 9,600, 16,000, 19,200, and

32,000 bps ~~through 32 Kbps~~ will be supported. For asynchronous timing, ~~baud~~ rates of 1,200, 2,400, 4,800, 9,600, 19,200 bps ~~through 19.2 Kbps~~ will be supported.

E. Implementation supports Network Block Transfer (NETBLT) Data Packet sizes from 64 bytes to 512 bytes.

F. Implementation supports NETBLT Buffers sizes from 64 bytes through 4096 bytes.

G. The TACO2 implementation supports NETBLT Burst sizes 1 through 32.

H. The TACO2 implementation interprets Internet Control Message Protocol (ICMP) request messages and responds with the appropriate ICMP Reply message in full and half duplex operation.

I. Implementation allows the operator to modify TACO2 setup parameters.

J. SUT interfaces to a STU-III terminal and communicates, via TACO2, to a distant terminal as described in JIEO Specification 9140.

K. TACO2 implementation checksums all DATA and LDATA packets.

L. The TACO2 implementation must ~~be able to set the action of the control leads of its RS-232-C I/O port or equivalent signals in a non-RS 232-C implementation. A subset of actions will be selected from the TACO2 Technical Interface Specifications (TIS) and will fall within the following ranges.~~ support the following operations, delays and waits for RS-232C (or equivalent) control signals as specified. Figures 5-1 and 5-2 show control lead positions and delays from sample TACO2 traffic.

~~1. TACO2 implementation will be able to set the action of the Request To Send (RTS) lead to any of the following: Hold high during the transfer, hold high after OPEN received or toggle lead with the sending of packets.~~

~~2. The time interval between rise of the RTS control lead and the start of the data on the Transmit Data (TD) lead must be selectable in the range 0-10 seconds to the nearest 100 msec.~~

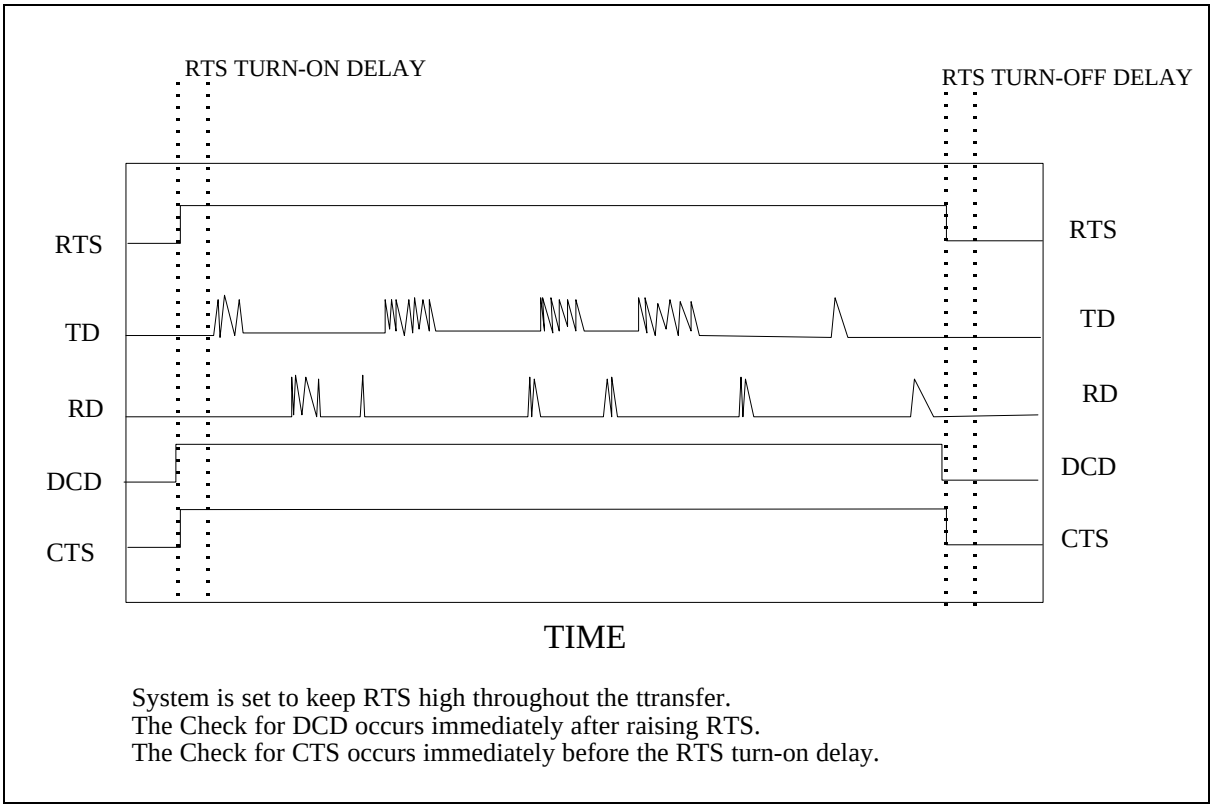
~~3. The time interval between the last frame bit of data on the TD lead and the fall of the RTS control lead must be selectable in the range 0-10 seconds to the nearest 100 msec.~~

~~4. Delaying the assertion of the RTS control lead must be selectable in the range 0-5 seconds to the nearest 100 msec.~~

~~5. Implementations will optionally wait for the Clear To Send (CTS) lead, after assertion of the RTS lead, for a time period selectable in the range 0-60 sec, to within 1 second.~~

~~6. Implementations will optionally wait for negation of the Data Carrier Detect (DCD) lead, after assertion of the RTS lead, for a time period selectable in the range 0-60 sec, to within 1 second.~~

~~7. Data Terminal Ready (DTR) lead will optionally be set to high at the~~



System is set to keep RTS high throughout the ttransfer.
The Check for DCD occurs immediately after raising RTS.
The Check for CTS occurs immediately before the RTS turn-on delay.

FIGURE 5-1. CONTROL LEAD TIMING SAMPLE OF AN ENTIRE FULL DUPLEX TRANSMISSION.

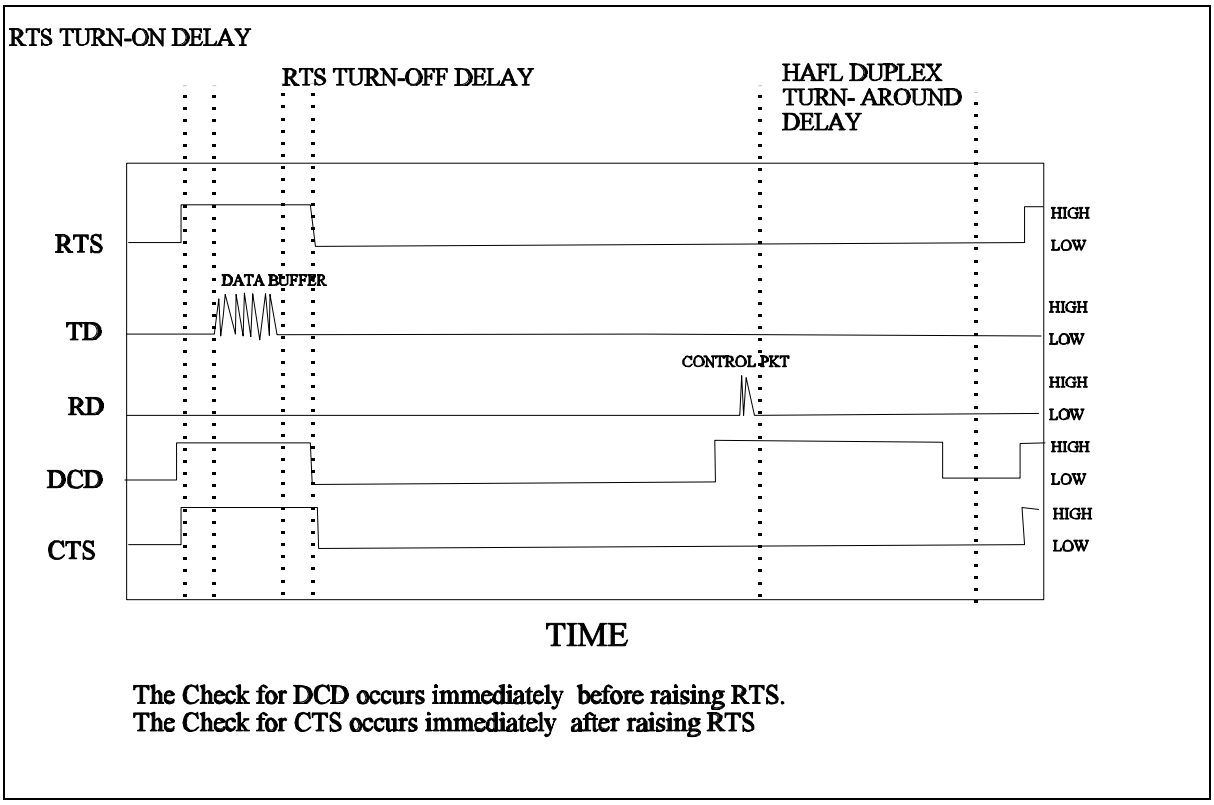


FIGURE 5-2. CONTROL LEAD TIMING SAMPLE FROM A HALF DUPLEX TRANSMISSION.

~~completion of a file transfer.~~

1. **RTS (Request-To-Send).** RTS must be held high while data is being transmitted. The implementation must have a means to wait a user-selectable amount of time after raising RTS and before transmitting data (RTS turn-on-delay). The implementation must also have a means to wait a user-selectable mount of time before lowering RTS after transmitting data (RTS turn-off delay). All delays (i.e., RTS turn-on delay, RTS turn-off delay, and half duplex turn-around delay) must be ~~user selectable~~ configurable from zero (0) to ten (10) seconds in intervals no larger than 200 milliseconds. The physical control lead response must have an accuracy of±200 milliseconds of the delay setting.

a. Full Duplex. In full duplex mode, RTS may either be kept high throughout the transfer or lowered between transmission bursts.

b. Half Duplex. In half duplex mode, RTS must be kept low between buffers to allow for incoming packets to be received. In half duplex mode, the implementation must wait a user specified amount of time (half duplex turn-around delay) after checking for DCD to be dropped low (if the DCD check is enabled) and before raising RTS.

c. Simplex. In simplex transmit mode, RTS may either be kept high throughout the transfer or lowered between transmission bursts. In simplex receive mode, RTS must remain low.

2. **CTS (Clear-To-Send).** The implementation may have an option, which can be disabled, to check and wait for CTS to be high before transmitting each packet or transmission burst. When enabled, the check for CTS must occur after RTS is raised and before initiating the RTS turn-on delay.

3. **DCD (Data-Carrier-Detect).** The implementation may have an option, which can be disabled, to check and wait for DCD to be either high or low before transmitting.

a. Full Duplex. When enabled, in full duplex mode, the implementation must check and wait for DCD to be high. In full duplex mode, the check for DCD should occur after raising RTS and before checking for CTS to be high (if the CTS check is enabled) and before initiating the RTS turn-on delay.

b. Half Duplex. When enabled, in half duplex mode, the implementation must check and wait for DCD to be low before waiting the half duplex turn-around delay and before raising RTS.

c. Simplex. When enabled, in simplex mode, the implementation may check and wait for DCD to be either high or low. If the implementation is set to check and wait for DCD to be low, the check should occur before raising RTS. If the implementation is set to check and wait for DCD to be high, the check should occur after raising RTS and before checking for CTS to be high (if the CTS check is enabled) and before initiating the RTS turn-on delay.

4. **DTR (Data-Terminal-Ready).** The implementation must hold DTR high while in receive mode and while transmitting a file. The DTR lead may be used as a resync line when connected to the communications equipment's resync line. If DTR is tied to a resync line, the implementation must pulse the DTR line between bursts or buffers as required to cause the equipment to resync (e.g., the KG-84 requires high voltage for at least 20 milliseconds). If the DTR line is not used as a DTR signal, DTR may need to be tied high on the communications equipment.

M. At a minimum, TACO2 implementation supports, the transmission and reception of the largest CLEVEL 1 file allowed by section 5.2 and 5.3 of this circular. This is currently limited to 1.213 Mbytes. The test file must be handled under a single file transfer, not split among multiple transfer sessions.

N. The TACO2 implementation supports BERT.

O. The TACO2 implementation supports FEC-1.

P. The TACO2 implementation supports abbreviated headers.

5-25 IMAGE DECOMPRESSION CRITERIA, VQ

A. The image data field of the VQ compressed NITFS file shall contain a VQ header followed by the compressed image data when the image compression field is set to M4 or C4.

B. The SUT shall support both v x h kernel-by-kernel decompression and individual rows for all v x h kernels stored together such that the image can be decompressed line-by-line.

C. The first image code in the VQ image data field shall be used to spatially decompress the v x h indices in the upper left corner of the image. The decompression shall continue from left to right across the columns of the first row of image codes, then down each of the rows of image codes sequentially.

D. For color images that are compressed, each value in the spatially decompressed image represents an index into the color table output.

E. VQ implementations within NITFS shall be limited to 8-bit RGB with LUT, or monochrome with or without LUT.

F. The compression ratio (COMRAT) field shall be present in all NITFS VQ files and shall contain a value given in the form n.nn representing the average number of bits-per-pixel for the image after compression. This entry is for informational purposes only and is not used in the decompression process.

G. The Image Compression (IC) field shall contain the value C4 if the image is not masked or M4 if the image is masked.

H. The NITFS VQ image data section shall provide the number of compression codes, the size of each 4x4 kernel organized in four tables.

I. The current implementation of VQ within NITFS shall use a single band with an associated LUT, and is considered to have an IMODE of B, band interleaved by block.

1. For current VQ NITFS applications, the number of spectral groups shall be 1.

2. The number of blocks per row and number of blocks per column fields within the NITFS image subheader define the number of image block tables in the spatial data subsection.

3. If the image contains one or more spectral band table(s), the pixels within the image will correspond to a single-value quantity such as a grayscale value or a single entry within a color table.

4. The image row level of organization in the NITFS image subheader shall correspond to the image row level in the VQ header.

5. The number of bands in the NITFS image subheader shall correspond to the number of bands in the VQ header.

J. Fields containing identification and origination information, file security information, and the number and size of the data items contained in the NITFS file shall be located in the NITFS file header. Within the image data section, multibyte fields are written in the "big endian" format.

K. A VQ header will have the following structure:

Image display parameter subheader
< Number of image rows
< Number of image codes per row
< Image code bit length

Compression section

Compression section subheader
< Compression algorithm id
< Number of compression lookup offset records
< Number of compression parameter offset records

Compression lookup subsection
< Compression lookup offset table offset
< Compression lookup table offset record length

Compression lookup offset table

Compression lookup offset record
< Compression lookup table id
< Number of compression lookup records
< Number of values per compression lookup record
< Compression lookup value bit length
< Compression lookup table offset

Compression lookup table

Compression lookup record

Compression lookup value, bits;var

APPENDIX A

LIST OF ACRONYMS

ANSI	American National Standards Institute
ARIDPCM	Adaptive Recursive Interpolated Differential Pulse Code Modulation
ASCII	American Standard Code for Information Interchange
ASD/C^3I	Assistant Secretary of Defense for Command, Control, Communications, and Intelligence
BERT	Bit Error Rate Test
BIT	Binary Digit
BPP	Bits-per-pixel
BPS	Bits Per Second
BWC	Bandwidth Compression
CCITT	Consultative Committee for International Telegraph and Telephone
CEDATA	Controlled Extension Data
CEL	Controlled Extension Length
CETAG	Controlled Extension Tag
CFS	Center For Standards (Joint Interoperability & Engineering Organization, Defense Information Systems Agency)
CGM	Computer Graphics Metafile
CIO	Central Imagery Office
CINC	Commander In Chief
CLEVEL	Compliance Level
CMY	Cyan, Magenta, Yellow
COMSEC	Communications Security
COMRAT	Compression Rate Code
C/S/A	CINC's/Services/Agencies
CR	Carriage Return
CR/LF	Carriage Return/Line Feed
CTE	Certification Test and Evaluation
CTS	Clear to Send
C^3I	Command, Control, Communications, and Intelligence
DATA	Data Buffer Sequence
DBMS	Database Management System
DCD	Data Carrier Detect
DCI	Director, Central Intelligence
DCT	Discrete Cosine Transform
DDN	Defense Data Network
DES	Data Extension Segment
DIA	Defense Intelligence Agency
DIRINT	Director of Intelligence
DISA	Defense Information Systems Agency
DMA	Defense Mapping Agency
DOD	Department of Defense
DQT	Define Q-Table

APPENDIX A

LIST OF ACRONYMS (Continued)

DSPO	Defense Support Project Office
DTR	Data Terminal Ready
EHD	Extended Header Data
EIA	Electronic Industries Association
FDCT	Forward Discrete Cosine Transform
FDX	Full Duplex
FEC	Forward Error Correction
FIPS	Federal Information Processing Standard
FPU	Floating Point Unit
FTP	File Transfer Protocol
GOSIP	Government OSI Profile
GUI	Graphical User Interface
HDLC	High-Level Data Link Control
HDX	Half Duplex
HFE	Human Factors Engineering
HUFFVALS	Huffman Values
IC	Intelligence Community
ICMP	Internet Control Message Protocol
ICS	Intelligence Community Standard
I/O	Input/Output
IFDCT	Inverse Forward Discrete Cosine Transform
IITSMP	Imagery Information Technology Standards Management Plan
IP	Internet Protocol
IMODE	Image Mode
ISMC	Imagery Standards Management Committee
ISO	International Organization for Standards
JIEO	Joint Interoperability and Engineering Organization
JINTACCS	Joint Interoperability Tactical Command and Control System
JITC	Joint Interoperability Test Command
JPEG	Joint Photographic Experts Group
LAN	Local Area Network
LBC	Label Background Color
LDATA	Last Data (packet of every buffer)
LF	Line Feed
LTC	Label Text Color
LUT	Look-up Table
MBZ	Must Be Zero
MIL-HDBK	Military Handbook
MIL-STD	Military Standard

APPENDIX A

LIST OF ACRONYMS (Continued)

MMU	Memory Management Unit
MOA	Memoranda of Agreement
MOT	Means of Testing
MRTFB	Major Range and Test Facility Base
NBPP	Number of Bits Per Pixel
NCCB	NITF Configuration Control Board
NETBLT	Network Block Transfer
NITF	National Imagery Transmission Format
NITFS	National Imagery Transmission Format Standard
NSA	National Security Agency
NTB	NITFS Technical Board
NUMDES	Number of Data Extension Segments
NUMRES	Number of Reserved Extension Segments
OASD(C^3I)	Office of the Assistant Secretary of Defense for C^3I
ODASD/I	Office of the Deputy Assistant Secretary of Defense for Intelligence
ODCSINT	Office of the Deputy Chief of Staff for Intelligence
ODNI	Office of the Director of Naval Intelligence
OJCS	Organization of the Joint Chiefs of Staff
OSI	Open Systems Interconnection
POC	Point of Contact
PPBS	Planning, Programming, and Budgeting System
PEM	Program Element Monitor
POSIX	Portable Operating System Interface for Computer Environments
Q-Table	Quantization Table(s)
RAM	Random Access Memory
REDATA	Registered Extension Data
REL	Registered Extension Length
RETAG	Registered Extension Tag
RGB	Red Green Blue
RTS	Request To Send
SIDS	Secondary Imagery Dissemination System
SLIP	Serial Line Internet Protocol
STA	Standard ASCII
STU-III	Secure Telephone Unit-3rd Generation
SUT	System Under Test
TACO2	Tactical Communications Protocol 2
TBP	To Be Published
TCP	Transmission Control Protocol
TD	Transmit Data

LIST OF ACRONYMS (Continued)

TIS	Technical Interface Specification
TMDE	Test, Measurement and Diagnostic Equipment
UDHD	User Defined Header Data
UDID	User Defined Image Data
USA	United States Air Force
USAF	United States Army
USMC	United States Marine Corps
USN	United States Navy
VQ	Vector Quantization
WAN	Wide Area Network
YCbCr	Y=Brightness of signal. Cb=Chrominance (blue). Cr=Chrominance (red).
YCM	Yellow, Cyan, Magenta
YIQ	Intensity, Inphase, Quadrature

APPENDIX B

NITFS FORMS

FROM: Sponsoring Organization: DATE:

Mailing Address:

Primary Point of contact:

Phone#:

Alternate Point of Contact:

Phone#:

Imagery System:

TO: Joint Interoperability Test ~~Center~~ Command
NITF Certification Test & Evaluation Facility
ATTN: ~~TCDBA~~ JTDB
Building 57305 Brainard Road
Ft. Huachuca, AZ 85613-7020

SUBJECT: Request for NITF: Certification ____ Recertification ____ Derived Certification ____

REQUEST TESTING AT: NITF Test Bed ____

Other: (include NITFS Form CTE-4) ____

Test Dates Requested: _____

ENCLOSURES:

NITFS Form CTE-2 NITFS System Registration Data	____ (Mandatory)
NITFS Form CTE-3 NITFS Software Registration Data	____ (Mandatory)
NITFS Form CTE-4 Alternate Test Site Request	____
One copy of SIDS Technical Manual(s)	____
One copy of SIDS Operator Manual(s)	____
Other: (i.e. additional testing desired)	____

NAME & TITLE	SIGNATURE (Sponsor)

NITFS FORM CTE-1
CERTIFICATION REQUEST **Page 1 of 1**

ITEM	ITEM VALUE
System Name *	
Date Form Completed	
System Sponsor: Organization Point of Contact Organization Code Mailing Address City, State and Zip Code Telephone Number Facsimile Number	
System Developer: Organization Point of Contact Organization Code Mailing Address City, State and Zip Code Telephone Number Facsimile Number	
Compliance Level Supported (00-06)	
Hardware Platform *	
Processor Type and Speed *	
Processor Accelerator(s) *	
Operating System and Version *	
NITFS FORM CTE-2 **NITFS SYSTEM REGISTRATION DATA** **Page 1 of 2**	

ITEM	ITEM VALUE
Memory Option(s): * Memory Management Unit Floating Point Unit Cache Other (Specify)	MMU: FPU: Cache: Other:
NITFS Software (name/version) *	
Native Mode Imagery Format	
Graphics Board(s)/Display Driver(s) * (# of bits supported by display)	
Image Processor Board *	
Frame Grabber Board *	
JPEG Compression Board *	
Other Auxiliary Processing Boards	
Asynchronous Communications; Number and type of ports supported *	
Synchronous Communications; Number and type of ports supported *	
Networks/Protocols Supported: (TACO2, TCP/IP/FTP, GOSIP, LAN, WAN, etc)	
Other Peripherals	
TEMPEST?	
Waiver(s) Granted	
Miscellaneous	
NITFS FORM CTE-2 **NITFS SYSTEM REGISTRATION DATA** **Page 2 of 2**	

* Indicates NITF Configuration Items.

ITEM	ITEM VALUES
NITF Software (name/version)	
Date of Form Completed	
Software Developer: Organization Point of Contact Organization Code Mailing Address City, State and Zip Code Telephone Number Facsimile Number	
Implementation Language(s)	
Assembler(s) Used For NITFS Modules Version #	
Compiler(s) Used For NITFS Modules Version #	
Linker(s) Used For NITFS Modules Version #	
System Platform	
Compliance Level Supported (00-06)	
Graphical User Interface (GUI) Environment (X-Windows, Motif, etc. / version)	
Processor Type and Speed Required	
Operating System and Version Required	
Subscribes to POSIX Standards	

NITFS FORM CTE-3
NITFS SOFTWARE REGISTRATION DATA **Page 1 of 2**

ITEM	ITEM VALUE
Memory Option(s): * Memory Management Unit Floating Point Unit Cache Other (Specify)	MMU: FPU: Cache: Other
RAM required to operate system	
Swap Space Required to run application	
Storage required to operate system	
Graphics Board(s)/Display Driver Supported	
Image Processor Board(s) Supported	
Frame Grabber Board(s) Supported	
JPEG Compression Board(s) Supported	
Other Auxiliary Board(s) Supported/Required	
Asynchronous Communications Supported	
Synchronous Communications Supported	
Networks/Protocols Supported (TACO2, TCP/IP/FTP, GOSIP, LAN, WAN, etc) / Version	
NITFS Functions Not Supported	
Miscellaneous	
NITFS FORM CTE-3 **NITFS SOFTWARE REGISTRATION DATA**	**Page 2 of 2**

* Indicates NITF Configuration Items.

SYSTEM NAME/ACRONYM:

PROPOSED TEST SITE ORGANIZATION:_____

TEST LOCATION (CITY, STATE, BASE):

_____

_____

POC: _____ PHONE: _____

DATE(S):_____

DIAGRAM OF TEST SPACES (ATTACHED) _____

SCIF _____ YES _____ NO

AVAILABLE WORK SPACE _____ _____ FEET

INTERFACE CABLES AVAILABLE _____

POWER AVAILABLE (INCLUDE NUMBER/TYPE OF SOCKETS, DISTANCE FROM WORK SPACE)

_____

_____

_____

PERSONNEL CLEARANCES REQUIRED _____

SECURITY POC_____

SECURITY POC ADDRESS _____

SERVICING SSO _____

NITFS FORM CTE-4
ALTERNATIVE TEST SITE REQUEST **Page 1 of 1**

APPENDIX C

NITF 2.0 FILE FORMAT REQUIREMENTS

This appendix contains the file format constraints for minimum NITFS compliance and must be used with the NITF Version 2.0 military standard.

- The term "NA" under Format Values indicates that this field is not applicable to a minimum compliant NITF 2.0 file.
- The letters R, O, and C in the Type column correspond to "Required," "Optional," and "Conditional," respectively.

APPENDIX C

TABLE C-1. FILE HEADER

(R) - REQUIRED, (O) = OPTIONAL, C = CONDITIONAL

FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
FHDR	File Type & Version	9	NITF02.00	R
CLEVEL	Compliance Level	2	01-06 , 00 & 07-99 Reserved	R
STYPE	System Type	4	4 Spaces (Reserved)	O
OSTAID	Originating Station ID	10	Alphanumeric (May not be all spaces)	R
FDT	File Date & Time	14	DDHHMMSSZMONYY	R
FTITLE	File Title	80	Alphanumeric	O
FSCLAS	File Security Classification	1	T, S, C, R, or U	R
FSCODE	File Codewords	40	Alphanumeric	O
FSCTLH	File Control and Handling	40	Alphanumeric	O
FSREL	File Releasing Instructions	40	Alphanumeric	O
FSCAUT	File Classification Authority	20	Alphanumeric	O
FSCTLN	File Security Control Number	20	Alphanumeric	O
FSDWN	File Security Downgrade	6	Alphanumeric	O
G	File Downgrading Event	40	"_____",YYMMDD,999998,999999	C
FSDEVT	File Copy Number	5	Alphanumeric If FSDWNG="999998"	O
FSCOP	File Number of Copies	5	00000 default, or actual copy #	O
FSCPYS	Encryption	1	00000 default, or actual count	R
ENCRYP			0 = Not Encrypted (This field must contain the value 0)	
ONAME	Originator's Name	27	Alphanumeric	O
OPHONE	Originator's Phone Number	18	Alphanumeric	O
FL	File Length	12	388-1213000 for CLEVEL 1 ~~388-21474836487~~ 000000000388-999999999999 (2 ~~Gigabyte max~~ Gbytes minus 1 byte) CLEVEL 2-6	R
HL	NITF Header Length	6	000388-002736	R

TABLE C-1. FILE HEADER (Continued)

FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
NUMI	Number of Images	3	000-020 All CLEVELs must pack at least 1 image CLEVEL REQUIREMENT 01-02 pack no more than 5 images 03-06 pack no more than 20 images 01-02 must unpack 0 to 5 images 03-06 must unpack 0 to 20 images	R
LISH001	Length of 1st Image Sub-Header	6	000439-202060	C
LI001	Length of 1st Image	10	Values calculated in bytes from image sizes ranging from 64 x 64 pixels to: CLEVEL REQUIREMENT 01 1K x 1K pixels by 1 & 8 bits (total file size not to exceed 1,213 kbs) 02 1k X 1k pixels by 1,8 & 24 bits 03 2K x 2K pixels by 1,8,24 bits 04 4K x 4K pixels by 1,8,12,16 & 24 bits 05 8K x 8K pixels by 1,8,12,16 & 24 bits 06 64K x 64K pixels 1,8,12 & 16 bits/pixel (CLEVEL 2-6 MAX FILE SIZE NOT TO EXCEED 2 GBYTES)	C

LISHnnn	Length of Nth Image Sub-Header	6	000439-202060	C
LInnn	Length of Nth Image	10	Maximum aggregate of pixels of the 2nd to Nth Image must not exceed that of the maximum common coordinate system allowed per the respective CLEVEL	C
NUMS	Number of Symbols	3	000-100	R
LSSH001	Length of 1st Symbol Sub-Header	4	0258-0298	C
LS001	Length of 1st Symbol	6	Symbol data CLEVEL MAXIMUM AGGREGATE 01-02 131,072 (~~130~~ 128k) 03 524,288 (.5 Meg) 04-06 1,048,576 (1 Meg)	C

LSSnnn	Length of Nth Symbol Sub- Header	4	0258-0298	C
LSnnn	Length of Nth Symbol	6	Symbol data	C
NUML	Number of Labels	3	000-100	R
LLSH001	Length of 1st Label Sub-Header	4	0212-0252	C
LL001	Length of 1st Label	3	Label data (1-320 Characters) Maximum aggregate size of all 100 labels: 2048 characters	C

LLSHnnn	Length of Nth Label Sub-Header	4	0212-0252	C
LLnnn	Length of Nth Label	3	Label data (1-320 characters)	C

TABLE C-1. FILE HEADER (Continued)

FIELD	DESCRIPTION	SIZE	FORMAT VALUES		TYPE
NUMT	Number of Text Segments	3	000-005 CLEVEL 01-02 000-032 CLEVEL 03-06		R
LTSH001	Length of 1st Text Sub-Header	4	0282-0322		C
LT001	Length of 1st Text Segment	5	Text data (1-99,999 characters) Maximum aggregate size of all text files: 100,000 characters		C

LTSHnnn	Length of Nth Text Sub-Header	4	0282-0322		C
LTnnn	Length of Nth Text Segment	5	Text data		C
NUMDES	Number of Data Extension Segments (DES)	3	000 (Will be 000 unless needed for overflow data)	However, if receiving other than 0 Data Extension segments, the system must adjust itself to move past data and unpack the remainder of the file correctly	R
LDSH001	Length of 1st Data Extension Segment (DES) subheader	4	0209-9999		C
LD001	Length of 1st DES Data Field	9	000000000-999999999		C
LDSHnnn	Length of Nth data extension segment subheader	4	0209-9999		C
LDnnn	Length of Nth DES Data Field	9	000000000-999999999		C
NUMRES	Number of Reserved Extension Segments (RES)	3	000	However, if receiving other than 0 Data Extension segments, the system must adjust itself to move past data and unpack the remainder of the file correctly	R
LRSH001	Length of 1st RES subheader	4	0000-9999		C
LR001	Length of 1st RES	7	0000000-9999999		C
LRSHnnn	Length of Nth RES subheader	4	0000-9999		C
LRnnn	Length of Nth RES	7	0000000-9999999		C
UDHDL	User Defined Header Data Length	5	00000	If receiving user defined data, system must at least move past user data and unpack the remainder of the file correctly	R
UDHOFL	User Defined Header Overflow	3	000-999 (see Note 1)		C
UDHD	User Defined Header Data	0	NA		C
XHDL	Extended Header Data Length	5	00000	If receiving Extended Data, the system must at least to move past Extended Data and unpack the remainder of the file correctly	R
XHOFL	Extended Header Overflow	3	000-999 (see Note 2)		C
XHD	Extended Header Data	**	NA		C

* As specified by User Defined Header Data Length
** As specified by Extended Header Data Length

Note 1: If present, this field shall contain "000" if the tagged record extensions in UDHD do not overflow into a DES, or shall contain the sequence number of the DES into which they overflow. This 3-byte field must be included in the total byte count of UDHDL, above. The UDHOFL field shall be omitted if the UDHDL field contains a value of zero.

Note 2: If present, this field shall contain "000" if the tagged record extensions in XHD do not overflow into a DES, or shall contain the sequence number of the DES into which they overflow. This 3-byte field must be included in the total byte count of XHDL, above. The XHOFL field shall be omitted if the XHDL field contains a value of zero.

TABLE C-2. IMAGE SUB-HEADER

FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
IM	File Part Type	2	IM	R
IID	Image ID	10	Must not be all spaces	R
IDATIM	Image Date & Time	14	DDHHMMSSZMONYY	O
TGTID	Target ID	17	BBBBBBBBBBFFFFFCC	O
ITITLE	Image Title	80	Alphanumeric	O
ISCLAS	Image Security Classification	1	T, S, C, R, or U	R
ISCODE	Image Codewords	40	Alphanumeric	O
ISCTLH	Image Control and Handling	40	Alphanumeric	O
ISREL	Image Releasing Instructions	40	Alphanumeric	O
ISCAUT	Image Classification Authority	20	Alphanumeric	O
ISCTLN	Image Security Control Number	20	Alphanumeric	O
ISDWNG	Image Security Downgrade	6	Alphanumeric,"_____",YYMMDD,999999,999998	O
ISDEVT	Image Downgrading Event	40	Alphanumeric,IF ISDWNG=999998	C
ENCRYP	Encryption	1	0= Not Encrypted (This value must be 0)	R
ISORCE	Image Source	42	Alphanumeric	O
NROWS	Number of Significant Rows in image	8	00000064-00065536 (Based on CLEVEL)	R
NCOLS	Number of Significant Columns in image	8	00000064-00065536 (Based on CLEVEL)	R
PVTYPE	Pixel value type	3	INT,B	R
IREP	Image Representation	8	Alphanumeric Mono, RGB, RGB/LUT, YCbCr601 Monochrome: Pack and Unpack all CLEVELs RGB/LUT: Unpack CLEVELs 2-6 Pack Optional RGB(24 bit color): Unpack CLEVELs 2-6 Pack only if native YC_bC_r(3 bands) compress only (JPEG): Unpack CLEVELS 2-6 Pack if native color Multispectral: TBD	R
ICAT	Image Category	8	VIS,SL,TI,FL,RD,EO,OP,HR,HS,VD,CP,BP,MAP,SAR,~~IR,~~MS,FP,MRI,XRAY, CAT	R
ABPP	Actual Bits-per-pixel Per Band	2	01,08,11,12,13,14,15,16	O
PJUST	Pixel Justification	1	R	O
ICORDS	Image Coordinate System	1	U, G, C, or N	R
IGEOLO	Image Geographic Location	60	ddmmssXdddmmssY (4 times) or ggXYZmmmmmmmmm (4 times)	C

TABLE C-2. IMAGE SUB-HEADER (Continued)

FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
NICOM	Number of Image Comments	1	0-9	R
ICOM1	Image Comment 1	80	Alphanumeric	C
--- ICOMnn	Image Comment N	80	Alphanumeric	C
IC	Image Compression	2	NC - No Compression; C1- Bi-Level C3 - JPEG;C4 - VQ(not masked); M4 - VQ(masked), NM, M0, M3	R
COMRAT	Compression Rate	4	IC / COMRAT C1 / 1D, 2DS, 2DH C3 / **00.0**, 00.1, 00.2, 00.3, 00.4, 00.5 C4 / **n.nn** M4 / **n.nn**	C
NBANDS	Number of Ba nds	1	1 or 3 CLEVEL / NBANDS 1 / 1 2-6 / 1 or 3	R
IREPBAND1	1st Band Component Representation	2	Alphanumeric "__" (2 spaces) or "R_", or "Y_"	R
ISUBCAT1	1st Band Significance for Image Representation	6	Alphanumeric - (Default 6 spaces)	R
IFC1	1st Band Image Filter Condition	1	N	R
IMFLT1	1st Band STD Image Filter Code	3	Reserved - 3 spaces	R
NLUTS1	1st Band Number of LUTS	1	0 (mono w/o LUT), 1 (mono w/LUT), 3 (RGB/LUT)	R
NELUT1	1st Band Number of LUT Entries	5	Calculated	C
LUTD1	1st Band Data of 1st LUT	£	LUT data	C
--- LUTDmm	1st Band Data of mmth LUT	£	LUT data	C
--- IREPBANDnn	nnth Band Component Representation	2	For N=2 G or Cb, For N=3 B or Cr	C
ISUBCATnn	nnth Band Significance for Image Representation	6	6 spaces	C
IFCnn	nnth Band Image Filter Condition	1	N	C
IMFLTnn	nnth Band STD Image Filter Code nnth Band Number of LUTS	3	Reserved - 3 Spaces	C
NLUTSnn	nnth Band Number of LUT Entries nnth Band Data of 1st LUT	1	0 (No LUT except in band 1	C
NELUTnn		5	Calculated	C
LUTD1	nnth Band Data of mmth LUT	£	LUT Data	C
--- LUTDmm		£	LUT Data	C

TABLE C-2. IMAGE SUB-HEADER (Continued)

FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
ISYNC	Image Sync Code	1	0	R
IMODE	Image Mode	1	B (Band interleaved by block), P (Band interleaved by pixel), S (Band sequential (only valid for multiple block images and multiple bands))	R
NBPR	Number of blocks per row	4	0001-0256	R
NBPC	Number of blocks per column	4	0001-0256	R
NPPBH	# of pixels per block(horiz.)	4	0064~~32~~-8192	R
NPPBV	# Of pixels per block(vert.)	4	0064~~32~~-8192	R
NBPP	# Of bits-per-pixel per band	2	01,08,12,16	R
IDLVL	Display Level	3	001-999	R
IALVL	Attachment Level	3	000-998	R
ILOC	Image Location	10	RRRRRCCCCC relative to AL origin	R
IMAG	Image Magnification	4	Alphanumeric 1.0, /2 for 1/2, /4 for 1/4, /8 for 1/8 /16 for 1/16, /32 for 1/32, /64 for 1/64, /128 for 1/128	R
UDIDL	User def. Img. data length	5	00000-99999	R
UDOFL	User def overflow	3	000-999	C
UDID	User defined image data	0	Registered tagged record extensions	C
IXSHDL	Extended Subheader data	5	00000-99999	R
IXSOFL	Extended Subheader overflow	3	000-999	C
IXSHD	Extended Subheader data	**	Controlled tagged record extensions	C

If receiving user defined data, the system must at least move past user data and unpack the remainder of the file correctly

If receiving Extended Data, the system must at least move past the data and unpack the remainder of the file correctly

£ One byte each entry
* As specified by UDIDL
** As specified by IXSHDL

TABLE C-3. SYMBOL SUB-HEADER

FIELDS	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
SY	File part type	2	SY	R
SID	Symbol id	10	Alphanumeric (May not be all spaces)	R
SNAME	Symbol name	20	Alphanumeric	O
SSCLAS	Symbol security classif	1	T,S,C,R, OR U	R
SSCODE	Symbol codewords	40	Alphanumeric	O
SSCTLH	Symbol control and handling	40	Alphanumeric	O
SSREL	Symbol releasing instruct	40	Alphanumeric	O
SSCAUT	Symbol classification auth	20	Alphanumeric	O
SSCTLN	Symbol security control num	20	Alphanumeric	O
SSDWNG	Symbol security downgrade	6	Alphanumeric "_____",YYMMDD,999999,999998	O
SSDEVT	Symbol downgrading event	40	Alphanumeric If FSDWNG="999998"	C
ENCRYP	Encryption	1	0=NOT ENCRYPTED (This value must be 0)	R
STYPE	Symbol type	1	B=Bit-mapped C=CGM O=Object (not used)	R
NLIPS	Number of lines per symbol	4	0000-9999	R
NPIXPL	Number of pixels per line	4	0000-9999	R
NWDTH	Line width	4	0000-9999 (Not used, default=0000)	R
NBPP	Number of bits-per-pixel	1	1 for Bit Mapped 0 for CGM symbols	R
SDLVL	Display level	3	001-999	R
SALVL	Attachment level	3	000-998	R
SLOC	Symbol location	10	RRRRRCCCCC	R
SLOC2	Second symbol location	10	RRRRRCCCCC	O
SCOLOR	Symbol color	1	N,K,W,R,O,B, AND Y (Not applicable for CGM use space)	R
SNUM	Symbol number	6	000000 for Bit-map & CGM	O
SROT	Symbol rotation	3	000	R
NELUT	Number of LUT entries	3	000	R
DLUT	Symbol LUT data	0	(NEVER APPEAR)	C
SXSHDL	Extended Subheader data length	5	00000 If receiving Extended Data, the system must at least move past the data and unpack the remainder of the file correctly	R
SXSOFL	Extended Subheader overflow	3	000-999	C
SXSHD	Extended Subheader Data	**	NA	C

* As specified by number of LUT entries
** As specified by Header Record Length

TABLE C-4. LABEL SUB-HEADER

FIELDS	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
LA	File part type	2	LA	R
LID	Label ID	10	Alphanumeric (May not be all spaces)	R
LSCLAS	Label security classif	1	T,S,C,R, OR U	R
LSCODE	Label codewords	40	Alphanumeric	O
LSCTLH	Label control and handling	40	Alphanumeric	O
LSREL	Label releasing instruct	40	Alphanumeric	O
LSCAUT	Label classification auth	20	Alphanumeric	O
LSCTLN	Label security control num	20	Alphanumeric	O
LSDWNG	Label security downgrade	6	Alphanumeric "_____",YYMMDD,999999,999998	O
LSDEVT	Label downgrading event	40	Alphanumeric	C
ENCRYP	Encryption	1	0=Not encrypted (value must be 0)	R
LFS	Label font style	1	`Default "Space"	R
LCW	Label cell width	2	00 (Note: May provide font size if label fits in CLEVEL display area)	O
LCH	Label cell height	2	00-99 (Note: May provide font size if label fits in CLEVEL display area)	O
LDLVL	Display level	3	001-999	R
LALVL	Attachment level	3	000-998	R
LLOC	Label location	10	RRRRRCCCCC	R
LTC	Label text color	3	For CLEVEL 01 1,1,1 (Black) 255,255,255 (White) For CLEVEL 02-06 1,1,1 (Black) 255,255,255 (White) 255,0,0 (Red) 250,125,0 (Orange) 0,0,255, (Blue) 0,255,0 (Green) 250,250,0 (Yellow)	R
LBC	Label background color	3	1 byte R,G and B 0,0,0 (Transparent) 1,1,1 (Black) & 255,255,255 (White)	R
LXSHDL	Extended subheader data length	5	00000	R
LXSOFL	Extended subheader overflow	3	000-999	C
LXSHD	Extended Subheader data	**	NA	

If receiving Extended Data, the system must at least move past the data and unpack the remainder of the file correctly

** As specified by Header Record Length

TABLE C-5. TEXT SUB-HEADER

FIELDS	DESCRIPTION	SIZE	FORMAT VALUES		TYPE
TE	File part type	2	TE		R
TEXTID	Text ID	10	Alphanumeric (May not be all spaces)		R
TXTDT	Text date and time	14	DDHHMMSSZMONYY		R
TXTITL	Text title	80	Alphanumeric		O
TSCLAS	Text security classification	1	T,S,C,R, OR U		R
TSCODE	Text codewords	40	Alphanumeric		O
TSCTLH	Text control and handling	40	Alphanumeric		O
TSREL	Text releasing instructions	40	Alphanumeric		O
TSCAUT	Text classification authority	20	Alphanumeric		O
TSCTLN	Text security control number	20	Alphanumeric		O
TSDWNG	Text security downgrade	6	Alphanumeric "_____",yymmdd,999999,999998		O
TSDEVT	Text downgrading event	40	Alphanumeric		O
ENCRYP	Encryption	1	0=Not encrypted (This value must be 0)		R
TXTFMT	Text format	3	STA or MTF		R
TXSHDL	Extended Subheader data length	5	00000	If receiving Extended Data, the system must at least move past the data and unpack the remainder of the file correctly	R
TXSOFL	Extended Subheader overflow	3	000-999		C
TXSHD	Extended Subheader data length	**	NA		

** As specified by Header Record Length

TABLE C-6. DATA EXTENSION SEGMENT SUB-HEADER

FIELDS	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
DE	FILE PART TYPE	2	DE	R
DESTAG	UNIQUE DES TYPE IDENTIFIER	25	Alphanumeric	R
DESVER	VERSION OF THE DATA FIELD DEFINITION	2	01-99	R
DESSG	SECURITY GROUP	†	Refer to (table xviii) of MIL-STD-2500 NITF Version 2.0	R
DESOFLW	OVERFLOWED HEADER TYPE	6	Alphanumeric	C
DESITEM	DATA ITEM OVERFLOWED	3	000 TO 999	C
DESSHL	LENGTH OF USER-DEFINED SUBHEADER FIELDS	4	0000-9999	R
DESSHF	USER DEFINED SUBHEADER FIELDS	*	Alphanumeric	C
DESDATA	USER-DEFINED DATA FIELD	**	User defined	R

† 167 OR 207- Refer to TABLE XVII of MIL-STD-2500 NITF VERSION 2.0

* Value specified in DESSHL

** Determined by user. If DESTAG = "Registered Extensions" or Controlled Extensions," this signifies the sum of the lengths of the tagged records.

APPENDIX D

ADAPTIVE RECURSIVE INTERPOLATED DIFFERENTIAL PULSE CODE MODULATION (ARIDPCM) REQUIREMENTS

TABLE D-1. General ARIDPCM Requirements

Item	Feature	Predicate	Status Pack/Unpack	Reference
D-1	Operates ARIDPCM Type 1; 8 bits/pixel.	NITF 1.1 files only	O* / M	1.5
D-2	Operates ARIDPCM Type 2; 11 bits/pixel.	Not used	O / O	1.5
D-3	Image Compression (IC) field of the image subheader is set to C2.	See note 1	O* / M	1.2, 3.7
D-4	ARIDPCM algorithm is defined with these four selectable compression rates (4.5, 2.3, 1.4 and 0.75 bits-per-pixel, bpp) for eight bit gray scale images.	Item D-1 See note 1	O* / M	4.2
D-5	ARIDPCM algorithm is be defined with these four selectable compression rates (6.4, 4.5, 2.3 and 1.4 bpp) for 11 bit gray scale images.	Item D-2 See note 1	O / O	4.2
D-6	Compression rate is specified in the COMRAT (compression rate code) field in the NITFS image sub-header.	Items D-4, D-5 See note 1	O* / M	4.2
D-7	Compression algorithm operates Non-driven mode.	See Note 2	O / M	4.6.1
D-8	Compression algorithm operates Driven mode.	See Note 2	O / M	4.6.2
D-9	Compression algorithm operates Composite mode.	See Note 2	O / M	4.6.3
D-10	In the Non-driven mode the ARIDPCM algorithm is a one pass operation where the busyness class is determined for a neighborhood based upon the selected compression rate	Item D-7	O / M	5.2.2
D-11	The Driven ARIDPCM algorithm is a two pass operation that guarantees a specific average number of bits-per-pixel over the entire image.	Item D-8	O / M	5.2.3
D-12	The Composite mode of the ARIDPCM algorithm combines the driven and non-driven techniques to compress areas of little interest as specified by the operator to a greater degree than those areas the operator specifies as high interest.	Item D-9	O / M	5.2.4 4.5.3(1)

* If ARIDPCM is supported on pack side, this item is mandatory

Note 1: Although the use of ARIDPCM by an image packer is optional, if used, the IC field must be set to C2 and the COMRAT field must contain a valid entry.

Note 2: Any 3 options may be used for compression as receive side must handle all three cases. If ARIDPCM is supported then at least one mode must be supported.

APPENDIX E

BI-LEVEL IMAGE COMPRESSION REQUIREMENTS

TABLE E-1. General Bi-level Image Compression Requirements

Item	Feature	Predicate	Status Pack/Unpack	Reference
E-1	Encoding Method is consistent with applicable standards and requirements documents.	See Note 1	O* / M	1.1
E-2	The image compression field of the image header is set to C1 to invoke Bi-level data compression.		O* / M	4.3
E-3	The mode of operation is specified in the Compression Rate Code section of the image header, using character, 1D, 2DS and 2DH.	Items E-4, E- 5, E-6	O* / M	1.5
E-4	Operates in Bi-level compression Mode 1.	See Note 2	O / M	1.5
E-5	Operates in Bi-level compression Mode 2.	See Note 2	O / M	1.5
E-6	Operates in Bi-level compression Mode 3.	See Note 2	O / M	1.5
E-7	Each coded image line is embedded within synchronization codes.	Items E-4, E-5, E-6	O / M	4.2
E-8	Uses Huffman Codes - As specified in MIL-STD-188-196 for one and two dimensional Bi-Level encoding.	Items E-4, E-5, E-6	O / M	5.1, 5.2, 5.3

* If Bi-level is supported on pack side, this item is mandatory

Note 1: The NITF application of Bi-Level Image Compression will be consistent with the following:

* MIL-STD-188-161C for Group 3 (G3) facsimile devices.
* FIPS 147 G3 facsimile apparatus for document transmission.
* CCITT recommendations for T.4.
* ANSI X3,4-1986 standard.

Note 2: If Bi-Level is supported on pack side at least one mode must be supported.

APPENDIX F

JOINT PHOTOGRAPHIC EXPERTS GROUP (JPEG)
REQUIREMENTS

TABLE F-1. General JPEG Requirements

Item	Feature	Predicate	Status Pack/Unpack	Reference
F-1	Operates in Sequential DCT-based mode.		M / M	4.11.1, 5.2
F-2	Operates in Progressive DCT-based mode.	*	O / O	4.11.2, 5.3
F-3	Operates in Hierarchical mode.	*	O / O	4.11.3, 5.4
F-4	Operates in Lossless JPEG mode.	*	O / O	4.10, 5.5
F-5	Uses Huffman Entropy encoding.		M / M	4.12, 5.2.2.5.1
F-6	Uses Arithmetic Entropy encoding.	*	O / O	4.12, 5.2.2.5.2
F-7	Uses 8 bit sample precision.		M / M	4.13.1
F-8	Uses 12 bit sample precision[1].		O / M	4.13.1
F-9	The quantized DCT coefficients, from the DCT based encoder, are within +/- 1 for each coefficient, when compared to reference test data. Mono & RGB		M / NA	ISO Draft IS 10918-2
F-10	The output of the DCT based decoder, when passed through a reference FDCT and Quantizer, is accurate to within +/- 1 when compared to reference test data for each coefficient. Mono & RGB		NA / M	ISO Draft IS 10918-2
F-11	Implementation encodes color (YCbCr) imagery; each component is compressed at full resolution[1].		O / M	5.1.1.2.1.2
F-12	Implementation encodes color (RGB) imagery; each component is compressed at full resolution[1].		O / M	5.1.1.2.1.1
F-13	Implementation converts other than 8 and 12 bit data to 8 and 12 bit data as necessary[1].		M / M	6.1
F-14	Implementation must support the use of restart markers.		M / M	5.2.3.1, 5.2.3.3.2
F-15	Implementations using custom huffman tables must build those tables according to MIL-STD-188-198.		M / M	5.2.2.5.1.9
F-16	Implementation processes RGB color imagery for IMODE = S		O/O	4.17.2, 4.17.2.1

TABLE F-1. General JPEG Requirements (Continued)

Item	Feature	Predicate	Status Pack/Unpack	Reference
F-17	Implementation processes RGB color imagery for IMODE = P		M/M	4.17.2, 4.17.2.2
F-18	Implementation processes RGB color imagery for IMODE = B		O/O	4.17.2, 4.17.2.3
F-19	Implementation processes YCbCr color imagery for IMODE = P with no subsampling		M/M	5.1.1.2.1.2
F-20	An RGB color image translated to YCbCr color space, then JPEG encoded and decoded, must have same general appearance as the original RGB image when JPEG encoded then decoded.		M/NA	5.1.1.2.1.3
F-21	Implementation processes YCbCr imagery with horizontal subsampling		O/M	5.1.1.2.1.3
F-22	Implementation processes YCbCr imagery with vertical subsampling		O/M	5.1.1.2.1.3
F-23	Implementation processes YCbCr imagery for both horizontal and vertical subsampling		O/M	5.1.1.2.1.3

1 Depending upon CLEVEL

* Future use only, cannot be used until approved by ISMC

APPENDIX G

COMPUTER GRAPHICS METAFILE (CGM)
REQUIREMENTS

TABLE G-1. General CGM Requirements

Item	Feature	Predicate	Status Pack/Unpack	Reference
G-1	Binary Encoding Format		M/M	5.1.1.6.1
G-2	Begin Metafile		M/M	5.1.1.1.1, 5.1.2.1.1
G-3	Metafile Version	Item G-2	M/M	5.1.1.2.1, 5.1.2.2.1
G-4	Metafile Description	Item G-2	M/M	5.1.1.2.2, 5.1.2.2.2, 5.2.2.1.2, 5.2.2.2.2,
G-5	Metafile Element List	Item G-2	M/M	5.1.1.2.3, 5.1.2.2.3
G-6	Font List	Item G-2	*C/M	5.1.1.2.4, 5.1.2.2.4, 5.2.2.2.12, 5.2.2.2.13
G-7	Begin Picture	Item G-2	M/M	5.1.1.1.2, 5.1.2.1.2
G-8	Color Selection Mode	Item G-7	O/M	5.1.1.3.1, 5.1.2.3.1
G-9	Edge Width Specification Mode	Item G-7	O/M	5.1.1.3.2, 5.1.2.3.2
G-10	Line Width Specification Mode	Item G-7	O/M	5.1.1.3.3, 5.1.2.3.3
G-11	VDC Extent	Item G-7	M/M	5.1.1.3.4, 5.1.2.3.4
G-12	Begin Picture Body	Item G-7	M/M	5.1.1.1.3, 5.1.2.1.3
G-13	Text Color	Item G-12	O/M	5.1.1.4.1, 5.1.2.4.1
G-14	Character Height	Item G-12	O/M	5.1.1.4.2, 5.1.2.4.2
G-15	Text Font Index	Item G-12	O/M	5.1.1.4.3, 5.1.2.4.3
G-16	Character Orientation	Item G-12	O/M	5.1.1.4.4, 5.1.2.4.4
G-17	Text	Item G-12	O/M	5.1.1.5.1, 5.1.2.5.1
G-18	Fill Color	Item G-12	O/M	5.1.1.4.5, 5.1.2.4.5

* C = Conditional (Font list required only if text is used)

Table G-1. General CGM Requirements (Concluded)

Item	Feature	Predicate	Status Pack/Unpack	Reference
G-19	Interior Style	Item G-12	O/M	5.1.1.4.6, 5.1.2.4.6
G-20	Edge Visibility	Item G-12	O/M	5.1.1.4.7, 5.1.2.4.7
G-21	Edge Width	Item G-12	O/M	5.1.1.4.8, 5.1.2.4.8
G-22	Edge Type	Item G-12	O/M	5.1.1.4.9, 5.1.2.4.9
G-23	Edge Color	Item G-12	O/M	5.1.1.4.10, 5.1.2.4.10
G-24	Polygon	Item G-12**	O/M	5.1.1.5.2, 5.1.2.5.2
G-25	Ellipse	Item G-12	O/M	5.1.1.5.3, 5.1.2.5.3
G-26	Line Width	Item G-12	O/M	5.1.1.4.11, 5.1.2.4.11
G-27	Line Type	Item G-12	O M	5.1.1.4.12, 5.1.2.4.12
G-28	Line Color	Item G-12	O/M	5.1.1.4.13, 5.1.2.4.13
G-29	Polyline	Item G-12**	O/M	5.1.1.5.4, 5.1.2.5.4
G-30	Elliptical Arc	Item G-12	O/M	5.1.1.5.5, 5.1.2.5.5, 5.2.2.1.29, 5.2.2.2.19
G-31	Elliptical Arc Close	Item G-12	O/M	5.1.1.5.6, 5.1.2.5.6, 5.2.2.1.30, 5.2.2.2.20
G-32	Rectangle	Item G-12	O/M	5.1.1.5.7, 5.1.2.5.7
G-33	Circle	Item G-12	O/M	5.1.1.5.8, 5.1.2.5.8
G-34	Circular Arc Center	Item G-12	O/M	5.1.1.5.9, 5.1.2.5.9
G-35	Circular Arc Center Close	Item G-12	O/M	5.1.1.5.9 5.1.2.5.9
G-36	End Picture	Item G-36	M/M	5.1.1.1.4, 5.1.2.1.4
G-37	End Metafile	Item G-36	M/M	5.1.1.1.5, 5.1.2.1.5

** Must do either polygon or polyline with associated features as a minimum.

APPENDIX H

TACTICAL COMMUNICATIONS PROTOCOL 2 (TACO2)
REQUIREMENTS

TABLE H-1. General TACO2 Requirements

Item	Feature	Predicate	Status Xmit/Rcv	Reference
H-1	Protocol operates in a point to point configuration		M/M	
H-2	Protocol operates in point to multi-point configuration		O/O	
H-3	Protocol operates across a LAN		O/O	
H-4	Protocol operates across a WAN		O/O	
H-5	Protocol operates in simplex mode		M/M	5.2.8.1
H-6	Protocol operates in half-duplex mode		M/M	5.2.8.2
H-7	Protocol operates in full duplex mode		M/M	5.2.8.3
H-8	TACO2 operates using HDLC framing for synchronous communication	When equipped with sync port	M/M	5.4.3 (1)
H-9	TACO2 operates using SLIP framing for asynchronous communication	When equipped with async port	M/M	5.4.3. (2)
H-10	TACO2 uses Forward Error Correction (FEC)		O/O	5.4.2 (1)
H-11	TACO2 includes the FEC sublayer		O/O	5.4.2
H-12	Implementation checksums all DATA and LDATA packets		M/M	5.2.8.6.2 (1)
H-13	TACO2 implementation can be configured to interface and operate with a KY-57/58 as described in JIEO Specification 9137.		O/O	
H-14	TACO2 implementation can be configured to interface and operate with a KG-84 as described in JIEO Specification 9138		O/O	
H-15	TACO2 implementation can be configured to interface and operate with a KY-68 as described in JIEO Specification 9139		O/O	
H-16	TACO2 implementation can be configured to interface and operate with a STU-III as described in JIEO Specification 9140		M/M	
H-17	TACO2 implementation provides a mechanism for compressed packet headers		O/O	5.4.1
H-18	TACO2 implementation generates Echo reply messages in response to Echo request messages (Ping)		M/MT	5.3.4.3.2
H-19	TACO2 Implementation shall provide the upper protocol layers with a Bit Error Rate Test facility		O/O	5.4.2.3.1
H-20	Bit Error Rate Test frame is formatted according to ref paragraph 5.4.2.3.2		O/O	5.4.2.3.2

APPENDIX I

NITF VERSION 1.1 REQUIREMENTS

TABLE I-1. NITF 1.1 MINIMUM COMPLIANCE (See note 1)

MESSAGE CONSTRAINTS FOR NITF 1.1 COMPLIANCE HEADER				
FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
MHDR	Message Type & Version	9	NITF 01.10	R
STYPE	System Type	6	6 Spaces	O
OSTAID	Originating Station ID	10	ASCII	R
MDT	Message Date & Time	14	DDHHMMSSZMONYY	R
MTITLE	Message Title	80	ASCII	O
MSCLAS	Message Security Classification	1	T, S, C, R or U	R
MSCODE	Message Codewords	40	Alphanumeric	O
MSCTLH	Message Control and Handling 40	Alphanumeric		O
MSREL	Message Releasing Instructions	40	Alphanumeric	O
MSCAUT	Message Classification Authority	20	Alphanumeric	O
MSCTLN	Message Security Control Number	20	Alphanumeric	O
MSDWNG	Message Security Downgrade	6	Alphanumeric	O
MSDEVT	Message Downgrading Event	40	Alphanumeric	C
MSCOP	Message Copy Number 5	0-99999		O
MSCPYS	Message Number of Copies	5	0-99999	O
ONAME	Originator's Name	27	ASCII	O
OPHONE	Originator's Phone Number	18	ASCII	O

Note 1: This table is taken directly from NITF version 1.1 Certification Plan Volume II, January 1990. Shaded areas indicate a constrained format value which deviates from the NITF version 1.1 document.

MESSAGE CONSTRAINTS FOR NITF 1.1 COMPLIANCE
HEADER (CONT)

FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
ML	Message Length	12	Calculated	R
HL	NITF Header Length	6	Calculated	R
NUMI	Number of Images	3	0-5	R
LISH001	Length of 1st Image Sub-Header	6	Calculated	C
LI001	Length of 1st Image	10	Values obtained from image sizes 8x8 to 512x512 by 1-8 bits	C
LISHnnn	Length of Nth Image Sub-Header	6	Calculated	C
Linnn	Length of Nth Image	10	Maximum aggregate size of 2nd to Nth Image is 50% of 512^2 x 8 bits (uncompressed)	C
NUMS	Number of Symbols	3	000-100	R
LSSH001	Length of 1st Symbol Sub-header	4	Calculated	C
LS001	Length of 1st Symbol	6	Max aggregate size for all 100 symbols is 512^2 bits	C

LSSHnnn	Length of Nth Symbol Sub-Header	4	Calculated	C
LSnnn	Length of Nth Image	6	Superseded by LS001	C
NUML	Number of Labels	3	000-100	R
LLSH001	Length of 1st Label Sub-Header	4	Calculated	C
LL001	Length of 1st Label	3	Maximum aggregate size for all 100 labels is 2000 characters	C

LLSHnnn	Length of Nth Label Sub-Header	4	Calculated	C
LLnnn	Length of Nth Label	3	Superseded by LL001	C
NUMT	Number of Text Files	3	0-5	R
LTSH001	Length of 1st Text Sub-Header	4	Calculated	C
LT001	Length of 1st Text file	5	Maximum aggregate size for all 5 text files is 10,000 characters	C
- - - -				

MESSAGE CONSTRAINTS FOR NITF 1.1 COMPLIANCE
HEADER (CONT)

FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
LTSHnnn	Length of Nth Text Sub-Header	4	Calculated	C
LTnnn	Length of Nth Text File	5	Superseded by LT001	C
NUMA	Number of Audio Segments	3	000	R
LASH001	Length of 1st Audio Sub-Header	4	NA	C
LA001	Length of 1st Audio Segment	9	NA	C
- - - -				
LASHnnn	Length of Nth Audio Sub-Header	4	NA	C
LAnnn	Length of Nth Audio Segment	9	NA	C
NUMF	Number of Non-Static Presentation Information Files (NPI)	3	000	R
LFSH001	Length of 1st NPI Sub-Header	4	NA	C
LF001	Length of 1st NPI File	7	NA	C
- - - -				
LFSHnnn	Length of Nth NPI Sub-Header	4	NA	C
LFnnn	Length of Nth NPI File	7	NA	C
UDHDL	User Defined Header Data Length	5	00000	R
UDHD	User Defined Header Data	*	NA	C
XHDL	Extended Header Data Length	5	00000	R
XHD	Extended Header Data	**	NA	C

* As specified by User Defined Header Data Length
** As specified by Extended Header Data Length

MESSAGE CONSTRAINTS FOR NITF 1.1 COMPLIANCE
IMAGE SUB-HEADER

FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
IM	Message Part Type	2	IM	R
IID	Image ID	10	ASCII	R
IDATIM	Image Date & Time	14	DDHHMMSSZMONYY	O
TGTID	Target ID	17	BBBBBBBBBBFFFFFCC	O
ITITLE	Image Title	80	ASCII	O
ISCLAS	Image Security Classification	1	T, S, C, R or U R	
ISCODE	Image Codewords	40	Alphanumeric	O
ISCTLH	Image Control and Handling	40	Alphanumeric	O
ISREL	Image Releasing Instructions	40	Alphanumeric	O
ISCAUT	Image Classification Authority	20	Alphanumeric	O
ISCTLN	Image Security Control Number	20	Alphanumeric	O
ISDWNG	Image Security Downgrade	6	Alphanumeric	O
ISDEVT	Image Downgrading Event	40	Alphanumeric	C
ENCRYP	Encryption	1	0=Not Encrypted 1=Encrypted	R
ISORCE	Image Source	80	ASCII	O
ICORDS	Image Coordinate System	1	U, G, C, or N	R
IGEOLO	Image Geographic Location	60	ddmmssXdddmmssY (4 times) or, ggxyzmmmmmmmmmm (4 times)	C
NICOM	Number of Image Comments	1	0-9	R
ICOM1	Image Comment 1	80	ASCII	C
- - - -				
ICOMnn	Image Comment N	80	ASCII	C
IC	Image Compression	2	NC or C2	R
COMRAT	Compression Rate Code	4	All C2 Values	C
NBANDS	Number of Bands	1	1	R
ITYPE1	1st band Image Type	8	ASCII	R

MESSAGE CONSTRAINTS FOR NITF 1.1 COMPLIANCE
IMAGE SUB-HEADER (CONT)

FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
IFC1	1st Band Image Filter Condition	1	N	R
IMFLT1	1st Band Standard Image Filter Code	3	Reserved	R
NLUTS1	1ST Band Number of LUTS	1	0 (assume linear ramp)	R
NELUT1	1st Band Number of LUT Entries	5	NA	C
LUTD1	1st Band Data of 1st LUT	+	NA	C
- - - -				
LUTDnn	1st Band Data of Nth LUT	+	NA	C
- - - -				
ITYPEnn	Nth Band Image Type	8	NA	C
IFCnn	Nth Band Image Filter Condition	1	NA	C
IMFLTnn	Nth Band Standard Image Filter Code	3	NA	C
NLUTSnn	Nth Band Number of LUTS	1	NA	C
NELUTnn	Nth Band Number of LUT Entries	5	NA	C
LUTD1	Nth Band Data of 1st LUT	+	NA	C
- - - -				
LUTDnn	Nth Band Data of Nth LUT	+	NA	C
ISYNC	Image SYNC Code	1	0	R
IMODE	Image Mode	1	S	R
NBPR	Number of Blocks Per Row	4	0001	R
NBPC	Number of Blocks Per Column	4	0001	R
NPPBH	Number of Pixels Per Block Horizontal	4	0008-0512	R
NPPBV	Number of Pixels Per Block Vertical	4	0008-0512	R
NBPP	Number of Bits-Per-Pixel Per Band	2	01-08	R
DLVL	Display Level	3	000-999	R
ALVL	Attachment Level	3	000-998	R
ILOC	Image Location	10	rrrrrccccc	R
IMAG	Image Magnification	4	Alphanumeric	R

MESSAGE CONSTRAINTS FOR NITF 1.1 COMPLIANCE
IMAGE SUB-HEADER (CONT)

FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
UDIDL	User Defined Image Data Length	5	00000	R
UDID	User Defined Image Data	*	NA	C
XSHDL	Extended Sub-Header Data Length	5	00000	R
XSHD	Extended Sub-Header Data	**	NA	C

\+ 1 Byte for each entry
* As specified by User Defined Image Data Length
** As specified by Extended Sub-Header Data Length

MESSAGE CONSTRAINTS FOR NITF 1.1 COMPLIANCE
SYMBOL SUB-HEADER

FIELD	DESCRIPTION	SIZE	FORMAT VALUES	TYPE
SY	Message Part Type	2	SY	R
SID	Symbol ID	10	ASCII	R
SNAME	Symbol Name	20	Alphanumeric	O
SSCLAS	Symbol Security Classification 1	T, S, C, R or U	R	
SSCODE	Symbol Codewords	40	Alphanumeric	O
SSCTLH	Symbol Control and Handling	40	Alphanumeric	O
SSREL	Symbol Releasing Instructions	40	Alphanumeric	O
SSCAUT	Symbol Classification Authority 20	Alphanumeric	O	
SSCTLN	Symbol Security Control Number	20	Alphanumeric	O
SSDWNG	Symbol Security Downgrade	6	Alphanumeric	O
SSDEVT	Symbol Downgrading Event	40	Alphanumeric	C
ENCRYP	Encryption	1	0=Not Encrypted 1=Encrypted	R
STYPE	Symbol Type	1	B=Bit-mapped	R
NLIPS	Number of Lines Per Symbol	4	0001-0512	R
NPIXPL	Number of Pixels Per Line	4	0001-0512	R
NWDTH	Line Width	4	0000-9999	R
NBPP	Number of Bits-per-pixel	1	1	R
DLVL	Display Level	3	000-999	R
ALVL	Attachment Level	3	000-998	R
SLOC	Symbol Location	10	rrrrrccccc	R
SLOC2	Second Symbol Location	10	rrrrrccccc	O
SCOLOR	Symbol Color	1	N,K, and W	R
SNUM	Symbol Number	6	Alphanumeric	O
SROT	Symbol Rotation	3	000	R
NELUT	Number of LUT Entries 3	000	R	

MESSAGE CONSTRAINTS FOR NITF 1.1 COMPLIANCE
SYMBOL SUB-HEADER (CONT)

FIELD	DESCRIPTION		SIZE	FORMAT VALUES		TYPE
DLUT	Symbol LUT Data		+	Pixel values in Order		C
XSHDL	Extended Sub-Header Data Length	5	00000		R	
XSHD	Extended Sub-Header Data		*	NA		C

* As specified by Extended Sub-Header Data Length

\+ For color LUT symbols, size of DLUT = 3 x NELUT
For gray scale LUT symbols, size of DLUT = NELUT

MESSAGE CONSTRAINTS FOR NITF 1.1 COMPLIANCE
LABEL SUB-HEADER

FIELD	DESCRIPTION		SIZE	FORMAT VALUES		TYPE
LA	Message Part Type		2	LA		R
LID	Label ID		10	ASCII		R
LSCLAS	Label Security Classification		1	T, S, C, R, or U		R
LSCODE	Label Codewords		40	Alphanumeric		O
LSCTLH	Label Control and Handling		40	Alphanumeric		O
LSREL	Label Releasing Instructions		40	Alphanumeric		O
LSCAUT	Label Classification Authority		20	Alphanumeric		O
LSCTLN	Label Security Control Number	20	Alphanumeric		O	
LSDWNG	Label Security Downgrade		6	Alphanumeric		O
LSDEVT	Label Downgrading Event		40	Alphanumeric		C
ENCRYP	Encryption		1	0=Not Encrypted 1=Encrypted	R	
LFS	Label Font Style		3	3 Spaces		R
LFZ	Label Font Size		2	00		R
DLVL	Display Level		3	000-999		R
ALVL	Attachment Level		3	000-998		R
LLOC	Label Location		10	rrrrrccccc		R
LTC	Label Text Color		3	0, 0, 0 (Transparent) and 1, 1, 1 (Black) and 255, 255, 255 (White)		R
LBC	Label Background Color		3	0, 0, 0 (Transparent) and 1, 1, 1 (Black) and 255, 255, 255 (White)		R
XSHDL	Extended Sub-Header Data Length	5	00000		R	
XSHD	Extended Sub-Header Data		*	NA		C

* As specified by Extended Sub-Header Data Length

MESSAGE CONSTRAINTS FOR NITF 1.1 COMPLIANCE
TEXT SUB-HEADER

FIELD	DESCRIPTION		SIZE	FORMAT VALUES		TYPE
TE	Message Part Type		2	TE		R
TEXTID	Text ID	10	ASCII		R	
TXTDT	Text Date & Time	14	DDHHMMSSZMONYY		R	
TXTITL	Text Title		80	ASCII		O
TSCLAS	Text Security Classification		1	T, S, C, R, or U		R
TSCODE	Text Codewords		40	Alphanumeric		O
TSCTLH	Text Control and Handling		40	Alphanumeric		O
TSREL	Text Releasing Instructions		40	Alphanumeric		O
TSCAUT	Text Classification Authority		20	Alphanumeric		O
TSCTLN	Text Security Control Number		20	Alphanumeric		O
TSDWNG	Text Security Downgrade		6	Alphanumeric		O
TSDEVT	Text Downgrading Event		40	Alphanumeric		C
ENCRYP	Encryption		1	0=Not Encrypted 1=Encrypted		R
TXTFMT	Text Format		3	STA		R
XSHDL	Extended Sub-Header Data Length	5	00000		R	
XSHD	Extended Sub-Header Data		*	NA		C

* As specified by Extended Sub-Header Data Length

APPENDIX J

VECTOR QUANTIZATION (VQ) REQUIREMENTS[1]

TABLE J-1. General VQ Requirements

Item	Feature	Predicate	Status Pack / Unpack	Reference (MIL-STD-188-199)
J-1	VQ compressed NITFS file contains VQ header when IC field set to M4		Note 2 / M	5.2.1
J-2	Supports kernel-by-kernel decompression and individual kernel rows for line-by-line decompression		Note 2 / M	5.2.1.a
J-3	The first image code in the VQ image data field is used to spatially decompress the v x h indices in the upper left corner of image, continuing left to right across the columns of the first row of image codes, then down each of the image code rows sequentially		Note 2 / M	5.2.1.b
J-4	Each value in a spatially decompressed image represents an index to the color table output (color compressed images only)		Note 2 / M	5.2.1.b
J-5	VQ implementations within NITFS are limited to 8-bit RGB with LUT, or monochrome with or without LUT		Note 2 / M	5.2.2
J-6	The compression ratio (COMRAT) field is present and contains a value in n.nn format		Note 2 / M	5.2.3.1
J-7	The image compression (IC) field contains C4 if image is not masked; M4 if masked		Note 2 / M	5.2.3.2
J-8	The VQ image data section provides compression codes, utilizing a 4x4 kernel, organized in 4 tables		Note 2 / M	5.2.3.3
J-9	Implementation utilizes a single band with associated LUT, IMODE B		Note 2 / M	5.2.3.4
J-10	The number of spectral groups is 1		Note 2 / M	5.2.3.4.a
J-11	The number of blocks per row and number of blocks per column fields within the NITFS image subheader define the number of block tables in the spatial data subsection		Note 2 / M	5.2.3.4.b

J-12	Pixels within the image correspond to a single-valued quantity such as a grayscale value or single entry within a color table (for images with 1 or more spectral band tables)		Note 2 / M	5.2.3.4.c

TABLE J-1. General VQ Requirements

Item	Feature	Predicate	Status Pack / Unpack	Reference (MIL-STD-188-199)
J-13	The image row level of organization in the NITFS image subheader corresponds to the image row level in the VQ header		Note 2 / M	5.2.3.4.d
J-14	The number of bands in the NITFS image subheader corresponds to the number of bands in the VQ header		Note 2 / M	5.2.3.4.e
J-15	Fields containing identification, origination, security, and the number and size of data items in the NITFS file are located in the NITFS file header.		Note 2 / M	5.3
J-16	Multibyte fields within the image data section are written in the "big endian" format		Note 2 / M	5.3
J-17	The VQ header follows the structure identified in section 5-25, paragraph K.		Note 2 / M	5.2.3

Note 1: Implementation of VQ is not mandatory; however, if a system implements VQ, this table applies.

Note 2: Recompression of VQ images is prohibited; however, a decompressed VQ image may be packed in its uncompressed state or in its original compressed form. VQ compression may be performed only by approved production facilities of VQ files.

APPENDIX K

DISTRIBUTION LIST

Office of the Assistant Secretary of Defense for C3I — 6
ATTN: ASD(C3I)
DASD(I)
DASD(C3)
DASD(P&R)
DASD(IM)
DASD(CISMC)
The Pentagon
Washington, DC 20301-5000

The Joint Staff — 4
ATTN: J2, J3, J6, J7
The Pentagon
Washington, DC 20318-6000

Commander in Chief, — 2
United States Central Command
ATTN: CCJ2, CCJ6
MacDill AFB, FL 33608-7001

Commander in Chief, — 2
United States European Command
ATTN: ECJ2, ECJ6
APO, AE 09128

Commander in Chief, — 2
United States Southern Command
ATTN: SCJ2, SCJ6
APO, AA 34003-5000

Commander in Chief, — 2
United States Atlantic Command
ATTN: J2, J6
Norfolk, VA 23511-2488

Commander in Chief, — 2
United States Special Operations Command
ATTN: SOJ2, SOJ6
MacDill AFB, FL 33608-6001

Commander in Chief, — 2
United States Pacific Command
ATTN: J2, J6
Camp H.M. Smith, HI 96861

Commander in Chief, — 2
United States Space Command
ATTN: J2, J6
Peterson AFB, CO 80914-5003

Commander in Chief, — 2
Strategic Air Command
ATTN: J2, J6
OFFUTT AFB, NE 68113-6600

Commander in Chief, — 2
United States Transportation Command
ATTN: TCJ2, TCJ6
Scott AFB, IL 62225-7001

Commander in Chief, — 1
Air Mobility Command
ATTN: SC
Scott AFB, IL 62225-7001

Commander in Chief, — 2
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ERRATA SHEET **June 20, 1997**

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
1-3	1-3		Add the following reference to paragraph 1-3: **V. MIL-STD-188-199.** Vector Quantization Decompression for the NITFS, 27 June 1994.	95-053 ISMC 6/27/96
1-3	1-3		Add the following references: ~~**CIO ASD SID05940000, version 1.** United States Imagery System Standards Profile for Image Distribution (USIS SPID), 27 May 1994~~. **CIO ASD #TBD.** NITFS Tagged Record Extension Register. (Document Control Number TBD.)	96-014A ISMC 7/24/96
1-3	1-3		Add the following references to paragraph 1-3: **CIO ASD #TBD, version 2.0.** National Imagery Transmission Format Standard Profile for Imagery Archives Extensions (PIAE), 25 April 1996 **CIO ASD SIA 05940000, version 1.0.** Standards Profile for Imagery Archives, 20 July 1994 Delete reference from RFC 96-015: ~~**CIO 2020, version 2.0.** Standards Profile for Imagery Access, 8 December 1995~~	96-015A ISMC 7/24/96
1-9	I-8 A.2.		Replace paragraph as follows: All NITFS imagery systems were to be NITF 2.0 compliant within two years of the January 1994 start date for the NITFS CTE program. To support interoperability during the two year transition, all NITF 2.0 compliant systems were required to allow for the proper interpretation and use of NITF Version 1.1 formatted files and the creation of NITF Version 1.1 compatible files. The requirement for NITF 2.0 systems to create NITF 1.1 files is now optional. However, due to the extensive existence of NITF 1.1 files, NITF 2.0 systems must continue to properly interpret NITF 1.1 files.	96-017A ISMC 6/12/97 (supersedes 96-017)

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-2	5-3	Last sentence	Make the following verbiage changes (*italics*) to last sentence: The specific test conditions for ARIDPCM Compression, Bi-Level Compression, JPEG Compression, CGM, TACO2, and *NITF version 1.1 backward compatibility, and VQ Decompression* are identified in Appendices D, E, F, G, H, I, *and J* respectively.	95-053 ISMC 6/27/96
5-3	Table 5-1		Change **Common Coordinate System Size/Clevel 6**: Delete: Max file size 2 Gbytes minus 1 byte	96-016A ISMC 7/24/96 (supersedes 96-016 and 95-005)
5-3	Table 5-1	Image Blocking	For CLEVELs 3-6, change: Multiple 256^2, 512^2, 10242 to: Multiple 32^2, 64^2, 128^2, 256^2, 512^2, 1024^2	94-008 ISMC 5/25/94
5-3	Table 5-1 (Cont)		Add to Table 5-1 (Continued) -- after "Registered Tags" and before "TACO2" -- to include DES and Reserved Segments as test items for systems and components that require their use.	95-033A ISMC 1/18/95

Data Extension Segment	FUTURE USE Only for Systems that Require Use	FUTURE USE Only for Systems that Require Use	FUTURE USE Only for Systems that Require Use	FUTURE USE Only for Systems that Require Use	FUTURE USE Only for Systems that Require Use	FUTURE USE Only for Systems that Require Use
Reserved Segment	FUTURE USE Only for Systems that Require Use	FUTURE USE Only for Systems that Require Use	FUTURE USE Only for Systems that Require Use	FUTURE USE Only for Systems that Require Use	FUTURE USE Only for Systems that Require Use	FUTURE USE Only for Systems that Require Use

5-4	Table 5-1 (Cont)		Add the following VQ section to Table 5-1, NITFS Certification Criteria Summary, following the current Bi-Level section:			95-053 ISMC 6/27/96

VQ Compression	4x4 Kermel 4 table w/wo masking	4x4 Kermel 4 table w/wo masking	4x4 Kermel 4 table w/wo masking	4x4 Kermel 4 table w/wo masking	4x4 Kermel 4 table w/wo masking	4x4 Kermel 4 table w/wo masking
VQ Monochrome	w/wo LUT IMODE = B	w/wo LUT IMODE = B	w/wo LUT IMODE = B	w/wo LUT IMODE = B	w/wo LUT IMODE = B	w/wo LUT IMODE = B
VQ 8-bit color	No	with LUT IMODE = B	with LUT IMODE = B	with LUT IMODE = B	with LUT IMODE = B	with LUT IMODE = B

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-4	Table 5-1		Make the following verbiage changes to Table 5-1, NITFS Certification Criteria Summary, in the current Controlled Tag Row: Change for ALL CLEVELs:	96-014A ISMC 7/24/96

Controlled Tags	Controlled tags may appear in the following fields: XHD, IXSHD, SXSHD, LXSHD, TXSHD, and "Controlled Extensions" DES regardless of CLEVEL.

PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-4	Table 5-1		Make the following verbiage changes to Table 5-1, NITFS Certification Criteria Summary, in the current Registered Tag section (change for ALL CLEVELS):	96-013 ISMC 6/27/96

Registered Tags	Registered tags may appear in the following fields: UDHD, UDID, and "Registered Extensions" DES regardless of CLEVEL.

PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-6	5-4 H	new	Add new sub-paragraph 5-4 H. (adjust current H-0 accordingly): **H. VQ DECOMPRESSION.** Support of VQ decompression is not mandatory; however, if implemented, the system must comply with the specifications and guidance contained within this document.	95-053 ISMC 6/27/96
5-7	5-4 O.		Replace paragraph to following: All NITF 2.0 unpack capable systems must be able to unpack any NITF version 1.1 minimum compliant file (no waivers) as defined in the NITF version 1.1 Volume I, NITF Certification Plan Policy, January 2, 1990, and Volume II, NITF Certification Plan Processes and Procedures. All pack capable systems may optionally support the capability to pack NITF files within the minimum constraints of NITF Version 1.1, but do not necessarily need to implement the waivable functions under the NITF 1.1 certification program (e.g., symbol, labels, text, display/attachment levels, and imagery less than 8 bits-per-pixel). Table 5-2 lists the basic NITF 1.1 message processing functions for receive (unpack) capable systems. Table 5-3 lists the functions for a transmit (pack) capable system. See Appendix I, Message Constraints for Minimum NITF 1.1 Compliance.	96-017A ISMC 6/12/97 (supersedes 96-017)
5-9	5-5 A.	3	Add to the end of the sentence: ", with the exception of the Label Text Color (LTC) and the Label Background Color (LBC) fields in the Label sub-header, which will be Hexadecimal."	94-011 ISMC 5/25/94

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-10	5-5 K.		Replace paragraph "K" as follows: Files sizes for CLEVEL 1 files must not exceed 1,213,000 bytes.	96-016A ISMC 7/24/96 (supersedes 95-005)
5-10	5-5 L.		Add 5-5 L as follows: For CLEVEL 6, unpack capable systems must at least be able to unpack files with file sizes up to and including 2 Gbytes minus 1 byte (2147483647 bytes). Systems capable of packing CLEVEL 6 files greater than 2 Gbytes may, as an option, also have the capability to split the file (file segmentation) for recipients which are limited to unpacking less than 2 Gbyte files. 1. File Segmentation. File segmentation will be at up to 27 H x 37 V blocks for the primary piece with the overflow going into the subsequent file(s). Upon receipt, the receiver can mosaic the files as required to present a seamless image to the user. 2. File Naming. When a file naming convention is used which identifies “FAF blocks,” the file names of the segmented image will indicate the FAF blocks at which the image was split. 3. Reduced Resolution Data Sets. When produced, reduced resolution data sets (i.e., RI through R7) will consist of a single file for each data set aligned with the original (un-segmented) image (R0).	96-016A ISMC 7/24/96
5-10	5-6 A.1.	new	Add new sub-paragraph 5-6.A.1.g (CLEVEL 1 unpack): g. VQ compressed (8 bits-per-pixel)	95-053 ISMC 6/27/96
5-10	5-6 A.2.	new	Add new sentence to end of paragraph 5-6.A.2 (CLEVEL 1 pack): Recompression of decompressed VQ images is prohibited; however, a decompressed VQ image may be packed in its uncompressed state (NC) or in its original compressed form (C4 or M4).	95-053 ISMC 6/27/96
5-11	5-6 B.1.c.(2)	1	Change: "Band Interleaved by Pixel (compressed)" to "Band Interleaved by Pixel (uncompressed and compressed)."	94-010 ISMC 5/25/94
5-10	5-6 B.1.	new	Add new sub-paragraph 5-6.B.1.f (CLEVEL 2 unpack): f. VQ compressed (8 bits-per-pixel)	95-053 ISMC 6/27/96

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-11	5-6 B.2.	new	Add new sentence to end of paragraph 5-6.B.2 (CLEVEL 2 pack): Recompression of decompressed VQ images is prohibited; however, a decompressed VQ image may be packed in its uncompressed state (NC) or in its original compressed form (C4 or M4).	95-053 ISMC 6/27/96
5-11	5-6 C.1.	3	Change block sizes of "256^2, 512^2, $1K^2$" to: "32^2, 64^2, 128^2, 256^2, 512^2, and $1K^2$."	94-008 ISMC 5/25/94
5-12	5-6 C.1.		Add new sub-paragraph 5-6.C.1.f (CLEVELs 3-5 unpack): f. VQ compressed (8 bits-per-pixel)	95-053 ISMC 6/27/96
5-12	5-6 C.2.		Add new sentence to end of paragraph 5-6.C.2 (CLEVELs 3-5 pack): Recompression of decompressed VQ images is prohibited; however, a decompressed VQ image may be packed in its uncompressed state (NC) or in its original compressed form (C4 or M4)	95-053 ISMC 6/27/96
5-13	5-6 D.1.	1	Change block sizes of "256^2, 512^2, $1K^2$" to: "32^2, 64^2, 128^2, 256^2, 512^2, and $1K^2$."	94-008 ISMC 5/25/94
5-13	5-6 D.1.	new	Add new sub-paragraph 5-6.D.1.e (CLEVEL 6 unpack): e. VQ compressed (8 bits-per-pixel).	95-053 ISMC 6/27/96
5-14	5-6 D.2.	new	Add new sentence to end of paragraph 5-6.D.2 (CLEVEL 6 pack): Recompression of decompressed VQ images is prohibited; however, a decompressed VQ image may be packed in its uncompressed state (NC) or in its original compressed form (C4 or M4).	95-053 ISMC 6/27/96
5-15	5-8 B.	2	Remove: For CLEVELs 1-3 it may optionally support 12 bit source sample precision.	94-009 ISMC 5/25/94

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-15	5-8 E.	1	Change: paragraph 5-7 D to: paragraph 5-8 D	94-015 ISMC 5/25/94
5-15	5-8 I.	1	Change: paragraph 5-7 H to: paragraph 5-8 H	94-015 ISMC 5/25/94
5-16	5-8 T.		Replace paragraph as follows: JPEG entropy decoders shall be able to decode and display a JPEG compressed image in which no more than 10% of the restart intervals in the compressed data stream contain errors. JPEG entropy decoders shall recognize the following condition as errors: - Restart Marker appearing too early in the data steam. - Restart Marker appearing too late in the data steam. - Restart Marker missing from the data stream. - Unknown Huffman Code in data stream. When an entropy decoder detects any of these errors in the compressed JPEG data stream, the imagery system must identify *the corrupted data in the* decoded *image.* ~~replace the decoded image file corrupted data with a pattern so that when the image is displayed, it is apparent that the compressed image data had an error~~. *This can be accomplished by suitable reporting or replacing the corrupted data with a suitable pattern so that when the decoded image is displayed, it is apparent that the compressed data stream had an error.* ~~This pattern shall be limited to the RST Interval(s) in which the error occurred. All RST intervals without errors must be decoded and displayed.~~	94-016 ISMC 3/1/95
5-16	5-8 V.	1-2	Delete paragraph	94-014 ISMC 5/25/94

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-17	5-9	B, C new G	Change the B through E as shown: ("italic" is added text) **B.** The SUT encoder supports compression of *bi-level images with* horizontal scan lines containing up to and including 2560 pixels and ~~vertical scan lines~~ containing up to and including 8192 ~~pixels~~ *scan lines* are constrained by CLEVEL limits. **C.** The SUT decoder supports decompression of *bi-level images with* horizontal scan lines containing up to and including 2560 pixels and ~~vertical scan lines~~ containing up to and including 8192 ~~pixels~~ *scan lines* as constrained by CLEVEL limits. Add the following: **G.** Bi-level compressed images are always a single block; multiple blocks are not allowed with bi-level compression.	96-018B ISMC 2/7/97
5-17	5-9	new H, I, J	Add new paragraphs as shown: **H.** When compressing imagery, the SUT encoder must convert the default bit representation of "0" black/"1" white to "1" black/"0" white prior to applying the compression algorithm. **I.** When decompressing imagery, the SUT decoder must convert the bit representation "1" black/"0" white to "0" black/"1" white. **J.** When LUTs are used, encoders shall base bi-level LUTs prior to bit conversion and compression. Decoders shall apply bi-level LUTs to the data stream after decompression and bit conversion.	97-005 ISMC 6/12/97
5-22	5-15		Replace paragraph A. as follows: **A.** The system must at least read and display text files associated with the text format code for standard ASCII (STA) and Message Text Format (MTF). Although the system must not be adversely affected when attempting to interpret a file which contains text with other format codes (e.g., OTH), it is not required to read and display the text in the original intended form.	96-022A ISMC 2/7/97

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-22	5-15		Add new paragraph C as follows: **C.** For text files formatted as MTF the implementation may optionally pass the text data field content to an MTF capable application for further processing. Change old paragraph "C" to "D" and old paragraph "D" to "E"	96-022A ISMC 2/7/97
5-23	5-16		Replace 5-16.A. (DATA EXTENSION SEGMENT CRITERIA) as follows: A. ~~The use of Data Extension Segments is not currently being certified. The number of tagged extensions currently approved is not expected to overflow the base image subheader extension area and there are no approved encapsulated data products at this time. therefore, files generated by an NITF compliant system must fill the Number of Data Extension Segments (NUMDES) field with "000."~~ When the number of tagged extensions overflow the base subheader extension area, the NITF compliant system must fill the Number of Data Extension Segments (NUMDES) field with the appropriate non-zero value upon generation of a NITF file. Files generated by NITF compliant systems that do not use Data Extension Segments must fill the Number of Data Extension Segments (NUMDES) field with “000.” Systems that require the use of Data Extension Segments, shall fill the Data Extension Segments (NUMDES) field, Length of Nth Data Extension Segment Subheader (LDSHnnn), and Length of Nth DES Data Field (LDnnn) with the associated values determined by the length of the DES. Systems that require the use of Data Extension Segments shall be tested for the generation of the associated data defined by the Data Extension Segment. Add as last sentence to "B": All overflow tags tested within the Data Extension Segment shall be registered with the NITFS ISMC. Systems that require the use of Data Extension Segments shall be tested for the interpretation of the associated data defined by the Data Extension Segment.	95-033A ISMC 1/18/95

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-23	5-17		Replace 5-17.A (RESERVED EXTENSION SEGMENT CRITERIA) as follows: **A.** ~~Since Reserved Segments are not yet defined in Version 2.0 of NITF, files generated by an NITF compliant system must fill the Number Reserved Extension Segments (NUMRES) field with "000".~~ Files generated by NITF compliant systems that do not use Reserved Extension Segments must fill the Number of Reserved Extension Segments (NUMRES) field with "000." Systems that require the use of Reserved Extension Segments shall fill the Number of Reserved Extension Segments (NUMRES) field, Length of Nth RES Subheader (LRSHnnn), and Length of Nth RES Reserved Field (LRnnn) with the associated values determined by the length of the RES. Systems that require the use of Reserved Extension Segments shall be tested for the generation of the associated data defined by the Reserved Extension Segment. Add as last sentence to "**B**": Systems that require the use of Reserved Extension Segments shall be tested for the interpretation of the associated data defined by the Reserved Extension Segment. All tested Reserved Extension Segments shall be controlled with the NITFS ISMC.	95-033A ISMC 1/18/95
5-24	5-19		Replace current section on ATTACHMENT LEVEL CRITERIA as follows: **A.** The image, symbol, or label component in the file having the lowest numerical display level shall have attachment level zero and the common coordinate system location of 0,0. **B.** SUTs capable of packing overlay elements within a file must support packing the elements with the base element having attachment level 000 and all other elements having attachment levels of 000 or greater. Unpack capable SUTs must support attachment levels over the range of 000 - 998. **C.** The attachment level of an overlay element must be equal to the display level of the overlay element or the base element to which it is attached. **D.** The display level of an element must always be numerically greater than its attachment level.	96-019 ISMC 6/27/97

PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-24	5-19		Replace current section on ATTACHMENT LEVEL CRITERIA as follows: (continued) **E.** The SUT must properly display and position all elements based on the specified row and column offset from the item's origin point to which it is attached. **F.** As an option, the SUT may maintain the parent-child relationship among its attached elements so that the elements may be treated together as a group for certain operations such as, moving, rotating, and displaying.	96-019 ISMC 6/27/97
5-24	5-20		Change sub-paragraph 5-20 as defined below: **5-20 USER DEFINED DATA, REGISTERED TAG CRITERIA.** The following criteria pertain to all implementations of the NITFS. **A.** Upon receipt of a file which contains information in the user defined data fields, the system must at least properly interpret the other legal components of the file. **B.** Only those user defined data tags registered with the ISMC may be used. **C.** Each registered tagged record extension consists of three required fields: RETAG, (6 byte unique extension identifier), REL (length of extension in bytes), and REDATA (user-defined data). **D.** A sequence of registered tagged record extensions can appear in the User Defined Header Data (UDHD) field of the NITF file header or any image subheader User Defined Image Data (UDID) field. **E.** A sequence of registered extensions can also appear in a Data Extension Segment (DES) which is designated to contain registered extensions. This condition will be identified by the first three characters of the UDHD or UDID field containing the sequence number of the "Registered Extension" DES into which the tags are placed. **F.** When the registered tagged record extension carries data that is associated with the file as a whole, it should appear in the UDHD field. If the extension carries data associated with an image data item in the file, it should appear in the UDID field of that item if sufficient room is available. **G.** A registered tagged record extension must be included in its entirety within the specific UDHD or UDID selected to contain it.	96-013 ISMC 6/27/96

PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-24	5-20		Replace E and F of section 5-20 USER DEFINED DATA, REGISTERED TAGS CRITERIA as follows: **E.** When the tagged record extension carries data that is associated with the file as a whole, it should appear in the UDHD field. If the extension carries data associated with an image data item in the field, it should appear in the UDID field of that item if sufficient room is available. ~~Registered tags are currently limited to appear only in the user-defined image data field of the base image.~~ **F.** A registered tagged record extension may appear in a Data Extension Segment (Paragraph 5-15) which is designated to contain registered tagged record extensions, but only if sufficient space is not available in the UDHD or a UDID, as appropriate. ~~This feature is currently not to be used.~~	95-033A ISMC 1/18/95
5-24	5-21		Replace sub-paragraph 5-21 as defined below: **A. General.** The following criteria pertain to all implementations of the NITFS. **1.** Upon receipt of a file which contains information in the extended data fields, the system must at least properly interpret the other legal components of the file. **2.** Only those controlled tags approved by the ISMC may be used **3.** Each controlled tagged record extension consists of three required fields: CETAG, (6 byte unique extension identifier), CEL (length of extension in bytes), and CEDATA (user-defined data). **4.** A sequence of controlled tagged record extensions can appear in the Extended Header Data (XHD) field of the NITF file header or in the Extended Sub-header Data field for any standard data type data item in the file. **5.** A sequence of controlled extensions can also appear in a Data Extension Segment (DES) which is designated to contain controlled extensions. This condition will be identified by the first three characters of the XHD, IXSHD, SXSHD, LXSHD, or TXSHD field containing the sequence number of the “Controlled Extension’s” DES into which the tags are placed. **6.** A controlled tagged record extension must be included in its entirety within the specific XHD, IXSHD, SXSHD, LXSHD, TXSHD, or DES selected to contain it.	96-014A ISMC 7/24/96

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-24	5-21		Replace sub-paragraph 5-21 as defined below: (continued) **B. Support Data Extensions (SDE's).** The following general criteria apply to those systems which produce NITF files containing SDEs. Production sources that produce NITFS files with SDE's must create these files in compliance with the NITFS and the approved SDE specification(s) appearing on the NITFS Tagged Record Extensions Register. **1.** All information, including numbers, contained in SDE tags must be given in the printable ASCII character set [space (32) through tilde (126)] with eight bits (one byte per character. **2.** All data in fields designated as "alphanumeric" must be left justified and padded with spaces as necessary to fill the field. **3.** All data in numeric fields must be right justified and padded with leading zeroes as necessary to fill the field. **4.** All required fields must be present and must contain valid data as defined in the SPID and associated documentation. **5.** The implementation must ensure that the correct data from the source data is mapped into the appropriate support data extension(s). **6.** The implementation must not allow the inclusion of an extension tag(s) if the information within the extension(s) is not available from the source support data. **7.** The implementation will ensure that information included in an extension(s) that is also required in NITF header or image subheader fields is mutually consistent.	96-014A ISMC 7/24/96
5-24	5-21 C.		Add sub-paragraph 5-21.C as defined below: [Para 5-21 A & B addressed in RFC] **5-21 C. Profile for Imagery Archives Extensions (PIAE).** The following criteria pertain to those systems which support the creation and use of PIAEs. Refer to the NITFS Profile for Imagery Archives Extensions (PIAE) for additional information. Production sources that produce NITFS files with PIAEs must create these files in compliance with the NITFS, NITFS Profile for Imagery Archives Extensions, and Standards Profile for Imagery ~~Access~~ Archives.	96-015A ISMC 7/24/96

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-25	5-21 C.		Add sub-paragraph 5-21.C as defined below: [Para 5-21 A & B addressed in RFC] (continued) 1. All information, including numbers, contained in PIAE tags must be given in the printable ASCII character set [space (32) through tilde (126)] with eight bits (one byte per character. 2. All data in fields designated as “alphanumeric” must be left justified and padded with spaces as necessary to fill the field. 3. All data in numeric fields must be right justified and padded with leading zeroes as necessary to fill the field. 4. All required fields must be present and must contain valid data as defined in the NITFS PIAE. 5. Only archive systems are allowed to enter data into the Access id (ACCESSID) field of the PIAPR tag. 6. When used, PIAE tags shall appear in the following extended data fields or “Controlled Extensions” DES if overflowed: a. PIAPR tag: XHD of main header; one per file. b. PIAIM tag: IXSHD of image subheader; one per each image in the file. c. PIATG tag: IXSHD of image subheader, SXSHD of symbol subheader, LXSHD of label subheader, TXSHD of text subheader; up to 250 per file. d. PIAPE tag: IXSHD of image subheader, SXSHD of symbol subheader, LXSHD of label subheader, TXSHD of text subheader; up to 250 per file. e. PIAVA tag: IXSHD of image subheader, SXSHD of symbol subheader, LXSHD of label subheader, TXSHD of text subheader; up to 250 per file. f. PIAEQ tag: IXSHD of image subheader, SXSHD of symbol subheader, LXSHD of label subheader, TXSHD of text subheader; up to 250 per file. 7. Any system modifying an NITF file will ensure that the FDT field has been updated. 8. As a minimum, systems submitting NITF files to an archive must include a PIAPR tag and a PIAIM tag for each image in the file they create for submission. 9. Receiving Archives: a. Must review NITF files to ensure they are in compliance with NITFS and PIAE documentation. This will include:	96-015A ISMC 7/24/96

PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-25	5-21 C.		Continued: 1. Checking NITF header and subheader data. 2. Checking PIAE tag data. 3. Identifying missing tags. b. When problems with incoming NITF files are identified, the file will be queued for operator review and action. c. Must archive submitted files that have no format problems without operator interface. d. Must apply a unique Access ID (ACCESSID) to newly submitted files containing an existing PIAPR tag when the file is new to the archive. e. Will insert a PIAPR tag if the submitted file is new to the archive and contains no PIAE tags. All required fields will be filled out and an Access ID (ACCESSID) will be assigned. 10. Disseminating Archives: a. Will ensure that non-NITF formatted files converted to NITF format are in compliance with all applicable NITFS and PIAE requirements. b. Will ensure NITFS compliance is maintained on output files resulting from data manipulation actions such as pixel subsampling, chipping, decompressing, compressing, etc. c. Will ensure that files, originally archived as NITF files, have preserved the original data integrity of imagery, symbol, label, text and support data.	96-015A ISMC 7/24/96
5-25	5-21	1	Replace D and E of section 5-21 EXTENDED HEADER, CONTROLLED TAGS CRITERIA as follows: **D.** A sequence of controlled tagged record extensions can appear in the Extended Header Data (EHD) field of the NITF file header or in the Extended Sub-header Data field for any standard data type data item in the file. ~~Controlled tags are currently limited to appear only in the image extended sub-header data field of the base image.~~ **E.** A sequence of controlled extensions can also appear in a Data Extension Segment which is designated to contain controlled extensions, but only if space is not available in the appropriate extended data field. ~~This feature is currently not to be used.~~	95-033A ISMC 1/18/95

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-28	5-24 D.	2-3	Change: Synchronous timing, baud rates of 300 bps through 32 Kbps will be supported. to: Synchronous timing, rates of 1,200, 2,400, 4,800, 9,600, 16,000, 19,200, and 32,000 bps will be supported.	94-013 ISMC 5/25/94
5-28	5-24 D.	2-3	Change: asynchronous timing, baud rates 300 bps through 19.2 Kbps will be supported. to: asynchronous timing, rates of 1,200, 2,400, 4,800, 9,600, 19,200 bps will be supported.	94-012 ISMC 5/25/94
5-29	5-24 L.		Replace paragraph as follows: **L.** The TACO2 implementation must support the following operation, delays and waits for RS-232C (or equivalent) control signals as specified. Figures 5-X and 5-Y show control lead positions and delays from sample TACO2 traffic. (In this paragraph, a “transmission burst” is defined as a sequence of one or more packets transmitted continuously. It does not necessarily correspond to a NETBLT burst, although it may.) 1. **RTS (Request-To-Send).** RTS must be held high while data is being transmitted. The implementation must have a means to wait a user-selectable amount of time after raising RTS and before transmitting data (RTS turn-on-delay). The implementation must also have a means to wait a user-selectable amount of time before lowering RTS after transmitting data (RTS) turn-off delay). All delays (i.e., RTS turn-on delay, RTS turn-off delay, and half duplex turn-around delay) must be ~~user selectable~~ configurable from zero (0) to ten (10) seconds in intervals no larger than 200 milliseconds. The physical control lead response must have an accuracy of ±200 milliseconds of the delay setting. a. **Full Duplex.** In full duplex mode, RTS may either be kept high throughout the transfer or lowered between transmission bursts. b. **Half Duplex.** In half duplex mode, RTS must be kept low between buffers to allow for incoming packets to be received. In half duplex mode, the implementation must wait a user-specified amount of time (half duplex turn-around delay) after checking for DCD to be dropped low (if the DCD check is enabled) and before raising RTS.	97-002 ISMC 2/7/97 (Old 96-011)

PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-29	5-24 L..		Continued: c. **Simplex.** In simplex transmit mode, RTS may either be kept high throughout the transfer or lowered between transmission bursts. In simplex receive mode, RTS must remain low. 2. **CTS (Clear-To-Send).** The implementation may have an option, which can be disabled, to check and wait for CTS to be high before transmitting each packet or transmission burst. When enabled, the check for CTS must occur after RTS is raised and before initiating the RTS turn-on delay. 3. **DCD (Data-Carrier-Detect).** The implementation may have an option, which can be disabled, to check and wait for DCD to be either high or low before transmitting. a. **Full Duplex.** When enabled, in full duplex mode, the implementation must check and wait for DCD to be high. In full duplex mode, the check for DCD should occur after raising RTS and before checking for CTS to be high (If the CTS check is enabled) and before initiating the RTS turn-on delay. b. **Half Duplex.** When enabled, in half duplex mode, the implementation must check and wait for DCD to be low before waiting the half duplex turn-around delay and before raising RTS. c. **Simplex.** When enabled, in simplex mode, the implementation may check and wait for DCD to be either high or low. If the implementation is set to check and wait for DCD to be low, the check should occur before raising RTS. If the implementation is set to check and wait for DCD to be high, the check should occur after raising RTS and before checking for CTS to be high (if the CTS check is enabled) and before initiating the RTS turn-on delay. 4. **DTR (Data-Terminal-Ready).** The implementation must hold DTR high while in receive mode and while transmitting a file. The DTR lead may be used as a resync line when connected to the communications equipment's resync line. If DTR is tied to a resync line, the implementation must pulse the DTR line between bursts or buffers as required to cause the equipment to resync (e.g., the KG-84 requires high voltage for at least 20 milliseconds). If the DTR line is not used as a DTR signal, DTR may need to be tied high on the communications equipment.	97-002 ISMC 2/7/97 (Old 96-011)

PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE

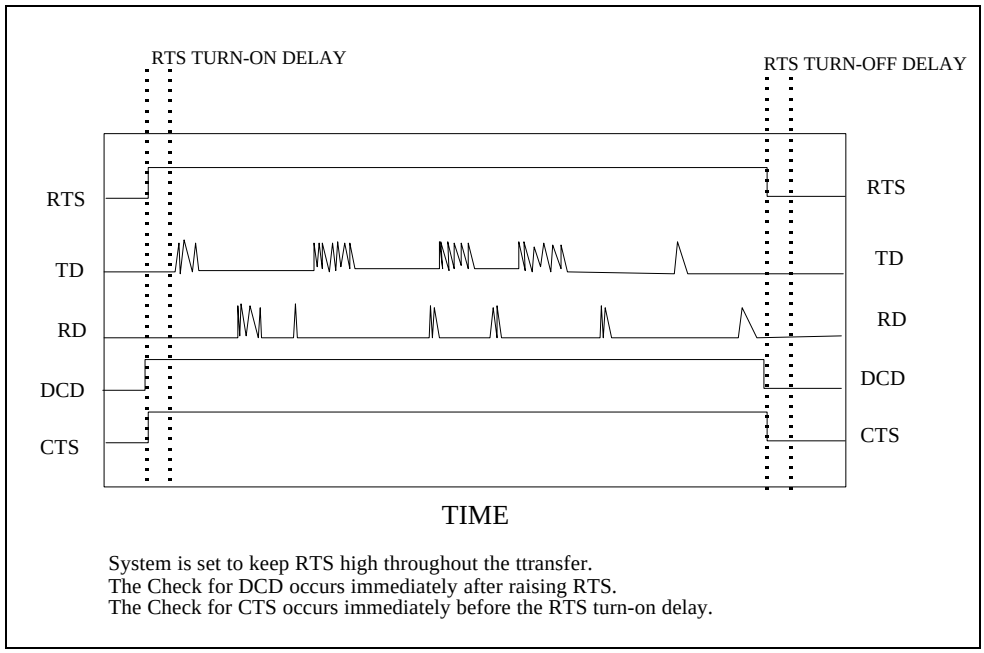

FIGURE 5-X. CONTROL LEAD TIMING SAMPLE OF AN ENTIRE FULL DUPLEX TRANSMISSION.

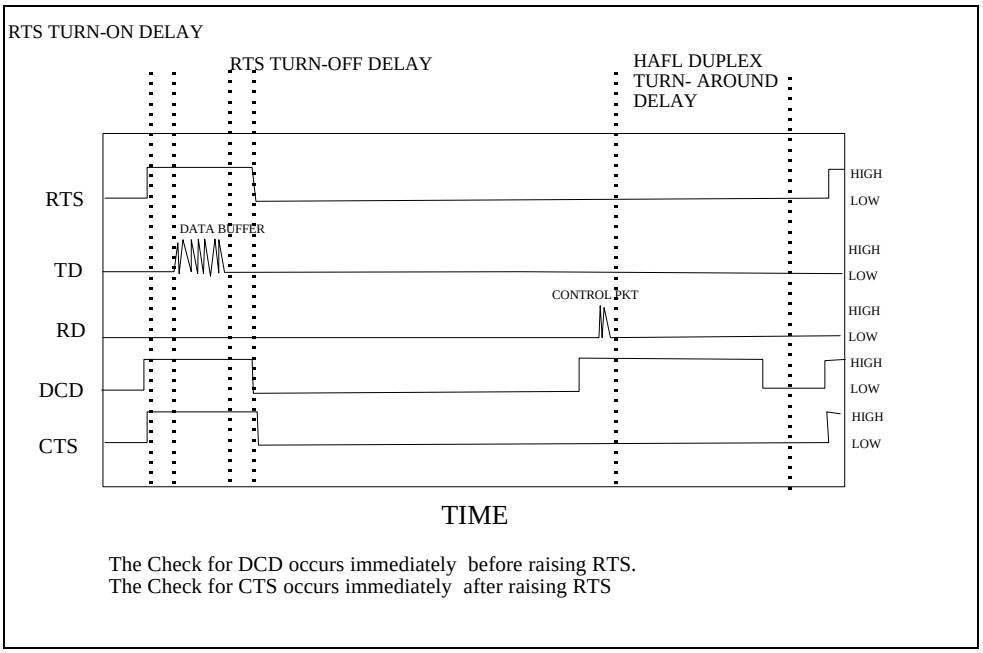

FIGURE 5-Y. CONTROL LEAD TIMING SAMPLE FROM A HALF DUPLEX TRANSMISSION.

PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-29	5-24		Add: **M.** At a minimum, TACO2 implementation supports, the transmission and reception of the largest CLEVEL 1 file allowed by section 5.2 and 5.3 of this circular. This is currently limited to 1.213 Mbytes. The test file must be handled under a single file transfer, not split among multiple transfer sessions.	96-003 ISMC 6/27/96
5-29	5-24		Add: **x.** The TACO2 implementation supports BERT.	95-039 ISMC 3/14/95
5-29	5-24		Add: **x.** The TACO2 implementation supports FEC-1.	95-040 ISMC 3/14/95
5-29	5-24		Add: **X.** The TACO2 implementation supports abbreviated headers.	95-041 ISMC 3/14/95
5-29	New 5-25		Add new section 5-25, as follows: **5.25 IMAGE DECOMPRESSION CRITERIA, VQ** **A.** The image data field of the VQ compressed NITFS file shall contain a VQ header followed by the compressed image data when the image compression field is set to M4 or C4. **B.** The SUT shall support both v x h kernel-by-kernel decompression and individual rows for all v x h kernels stored together such that the image can be decompressed line-by-line. **C.** The first image code in the VQ image data field shall be used to spatially decompress the v x h indices in the upper left corner of the image. The decompression shall continue from left to right across the columns of the first row of image codes, then down each of the rows of image codes sequentially. **D.** For color images that are compressed, each value in the spatially decompressed image represents an index into the color table output. **E.** VQ implementations within NITFS shall be limited to 8-bit RGB with LUT, or monochrome with or without LUT.	95-053 ISMC 6/27/96

PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-29	New 5-25		Continued: **F.** The compression ratio (COMRAT) field shall be present in all NITFS VQ files and shall contain a value given in the form n.nn representing the average number of bits-per-pixel for the image after compression. This entry is for informational purposes only and is not used in the decompression process. **G.** The Image Compression (IC) field shall contain the value C4 if the image is not masked or M4 if the image is masked. **H.** The NITFS VQ image data section shall provide the number of compression codes, the size of each 4x4 kernel organized in four tables. **I.** The current implementation of VQ within NITFS shall use a single band with an associated LUT, and is considered to have an IMODE of B, band interleaved by block. 1. For current VQ NITFS applications, the number of spectral groups shall be 1. 2. The number of blocks per row and number locks per column fields within the NITFS image subheader define the number of image block tables in the spatial data subsection. 3. If the image contains one or more spectral band table(s), the pixels within the image will correspond to a single-value quantity such as a grayscale value or a single entry within a color table. 4. The image row level of organization in the NITFS image subheader shall correspond to the image row level in the VQ header. 5. The number of bands in the NITFS image subheader shall correspond to the number of bands in the VQ header. J. Fields containing identification and origination information, file security information, and the number and size of the data items contained in the NITFS file shall be located in the NITFS file header. Within the image data section, multibyte fields are written in the "big endian" format.	95-053 ISMC 6/27/96

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
5-29	New 5-25		Continue new 5-25 as follows: K. A VQ header will have the following structure: Image display parameter subheader < Number of image rows < Number of image codes per row < Image code bit length Compression section Compression section subheader < Compression algorithm id < Number of compression lookup offset records < Number of compression parameter offset records Compression lookup subsection < Compression lookup offset table offset < Compression lookup table offset record length Compression lookup offset table Compression lookup offset record < Compression lookup table id < Number of compression lookup records < Number of values per compression lookup record < Compression lookup value bit length < Compression lookup table offset Compression lookup table Compression lookup record Compression lookup value, bits;var	95-053 ISMC 6/27/96
A-3	Appx A	4	Change: DQT, Defense Q-Table to DQT, Define Q-Table	94-019 ISMC 5/25/94
A-7	Appx A		Add new acronym: VQ, Vector Quantization	95-053 ISMC 6/27/96
C-2	Table C-1	FL	Change FL format value to: 000000000388-999999999999	96-016A ISMC 7/24/96 (supersedes 95-005)

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
C-2	Table C-1	FL	Change FL format value from: "2147483648" (2 Gbytes) to: "2147483647" (2 Gbytes minus 1 byte)	95-005 ISMC 10/20/94
C-4	Table C-1		Following the UDHDL and XHDL entries on page C-4, add the following respectively: FIELD DESCRIPTION SIZE FORMAT TYPE VALUES UDHOFL User Defined Header Overflow 3 000-999 (See note 1) C XHOFL Extended Header Overflow 3 000-999 (See note 2) C	97-008 ISMC 2/7/97
C-4	Table C-1		Include the following notes at the base of Table C-1, on the same page as the above entries: Note 1. If present, this field shall contain "000" if the tagged record extensions in UDHD do not overflow into a DES, or shall contain the sequence number of the DES into which they overflow. This 3-byte field must be included in the total byte count of UDHDL, above. The UDHOFL field shall be omitted if the UDHDL field contains a value of zero. Note 2. If present, this field shall contain "000" if the tagged record extensions in XHD do not overflow into a DES, or shall contain the sequence number of the DES into which they overflow. This 3-byte field must be included in the total byte count of XHDL, above. The XHOFL field shall be omitted if the XHDL field contains a value of zero.	97-008 ISMC 2/7/97
C-5	Table C-2		Modify ICAT, Format Values as follows: VIS, SL, TI, FL, RD, EO, OP, HR, HS, VD, CP, BP, MAP, SAR, MS, FP, MRI, XRAY, CAT	97-007 ISMC 2/7/97
C-6	Table C-2	IC field	Update Table C-2 as follows: NC - No compression C1 - Bi-Level C3 - JPEG C4 - VQ (Not masked) M4 - VQ(Masked)	95-053 ISMC 6/27/96

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
C-6	Table C-2	COMRAT	Add to COMRAT field to provide for use of custom Q-tables: IC COMRAT C3 **00.0**, 00.1, 00.2, 00.3, 00.4, 00.5	95-058 ISMC 6/27/96
C-6	Table C-2	COMRAT field	Add corresponding "FORMAT VALUES" to read as follows: IC COMRAT C4 n.nn M4 n.nn	95-053 ISMC 6/27/96
C-10	Table C-5	TXTFMT	Move: "(This value must be 0)" to previous line Change "STA" to "STA or MTF"	96-022A ISMC 2/7/97
I-1	Appx I	MDT Line	Change: DDHHMMSSVMONYY to DDHHMMSSZMONYY	94-018 ISMC 5/25/94

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
I-2	Appx I		Add missing fields applicable to an NITF 1.1 file header which were inadvertently dropped when document was published.	95-004 ISMC 3/14/95

NUMS	Number of Symbols	3	000-100	R	
LSSH001	Length of 1st Symbol Sub-header	4	Calculated		C
LS001	Length of 1st Symbol	6	Max aggregate size for all 100 symbols is 512^2 bits		C

LSSHnnn	Length of Nth Symbol Sub-Header	4	Calculated		C
LSnnn	Length of Nth Image	6	Superseded by LS001		C
NUML	Number of Labels	3	000-100	R	
LLSH001	Length of 1st Label Sub-Header	4	Calculated		C
LL001	Length of 1st Label	3	Maximum aggregate size for all 100 labels is 2000 characters	C	

LLSHnnn	Length of Nth Label Sub-Header	4	Calculated		C
LLnnn	Length of Nth Label	3	Superseded by LL001		C
NUMT	Number of Text Files	3	0-5		R
LTSH001	Length of 1st Text Sub-Header	4	Calculated	C	
LT001	Length of 1st Text file	5	Maximum aggregate size for all 5 text files is 10,000 characters		C
- - - -					
LTSHnnn	Length of Nth Text Sub-Header	4	Calculated		C
LTnnn	Length of Nth Text File	5	Superseded by LT001		C
NUMA	Number of Audio Segments	3	000	R	
LASH001	Length of 1st Audio Sub-Header	4	NA		C
LA001	Length of 1st Audio Segment	9	NA		C
- - - -					
LASHnnn	Length of Nth Audio Sub-Header	4	NA		C
LAnnn	Length of Nth Audio Segment	9	NA		C
NUMF	Number of Non-Static Presentation Information Files (NPI)	3	000		R
LFSH001	Length of 1st NPI Sub-Header	4	NA		C
LF001	Length of 1st NPI File	7	NA		C

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
I-4	Appx I	20	After "NBPC" and before "DLVL", add in the appropriate columns: NPPBH Number of Pixels per Block Horizontal 4 0008-0512 R NPPBV Number of Pixels Per Block Vertical 4 0008-0512 R NBPP Number of Bits-Per-Pixel Per Band 2 01-08 R	94-017 ISMC 5/25/94
J-1	Appx J	new	Add new Appendix J, as follows:	95-053 ISMC 6/27/96

APPENDIX J

VECTOR QUANTIZATION (VQ) REQUIREMENTS[1]

TABLE J-1. General VQ Requirements

Item	Feature	Predicate	Status Pack / Unpack	Reference (MIL-STD-188-199)
J-1	VQ compressed NITFS file contains VQ header when IC field set to M4		Note 2 / M	5.2.1
J-2	Supports kernel-by-kernel decompression and individual kernel rows for line-by-line decompression		Note 2 / M	5.2.1.a
J-3	The first image code in the VQ image data field is used to spatially decompress the v x h indices in the upper left corner of image, continuing left to right across the columns of the first row of image codes, then down each of the image code rows sequentially		Note 2 / M	5.2.1.b
J-4	Each value in a spatially decompressed image represents an index to the color table output (color compressed images only)		Note 2 / M	5.2.1.b
J-5	VQ implementations within NITFS are limited to 8-bit RGB with LUT, or monochrome with or without LUT		Note 2 / M	5.2.2
J-6	The compression ratio (COMRAT) field is present and contains a value in n.nn format		Note 2 / M	5.2.3.1
J-7	The image compression (IC) field contains C4 if image is not masked; M4 if masked		Note 2 / M	5.2.3.2

TABLE J-1. General VQ Requirements

PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE

J-8	The VQ image data section provides compression codes, utilizing a 4x4 kernel, organized in 4 tables		Note 2 / M	5.2.3.3
J-9	Implementation utilizes a single band with associated LUT, IMODE B		Note 2 / M	5.2.3.4
J-10	The number of spectral groups is 1		Note 2 / M	5.2.3.4.a
J-11	The number of blocks per row and number of blocks per column fields within the NITFS image subheader define the number of block tables in the spatial data subsection		Note 2 / M	5.2.3.4.b
J-12	Pixels within the image correspond to a single-valued quantity such as a grayscale value or single entry within a color table (for images with 1 or more spectral band tables)		Note 2 / M	5.2.3.4.c
J-13	The image row level of organization in the NITFS image subheader corresponds to the image row level in the VQ header		Note 2 / M	5.2.3.4.d
J-14	The number of bands in the NITFS image subheader corresponds to the number of bands in the VQ header		Note 2 / M	5.2.3.4.e
J-15	Fields containing identification, origination, security, and the number and size of data items in the NITFS file are located in the NITFS file header.		Note 2 / M	5.3
J-16	Multibyte fields within the image data section are written in the "big endian" format		Note 2 / M	5.3
J-17	The VQ header follows the structure identified in section 5-25, paragraph K.		Note 2 / M	5.2.3

Note 1: Implementation of VQ is not mandatory; however, if a system implements VQ, this table applies.

Note 2: Recompression of VQ images is prohibited; however, a decompressed VQ image may be packed in its uncompressed state or in its original compressed form. VQ compression may be performed only by approved production facilities of VQ files.

ADMINISTRATIVE ERRATA SHEET **June 20, 1997**

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PAGE	PARA	LINE	COMMENT	RFC AUTHORIZING CHANGE
throughout	throughout		Change: Joint Interoperability Test Center to: Joint Interoperability Test Command	Admin. Change
throughout	throughout		Change Arizona area code from: 602 to: 520	Admin. Change
1-11	1.11.A		Change the NITFS CERTIFICATION PROGRAM MANAGEMENT Point of Contact from: CIO to: National Imagery and Mapping Agency (NIMA)	Admin. Change
1-3	1-3 R.		Change date from: 27 November 1989 to: 01 March 1989	Admin. Change
3-2	3-2.A.3		Change ATTN GAC from: GAC Ms. Willets to: JTAF Ms. Pais	Admin. Change
	Cover Page		with 20 June 1997 errata incorporated	Admin. Change
	Forward		Incorporated in this release of the 30 June 1993 version of the JIEO CIRCULAR 9008 are all of the Request For Change (RFC) additions (in red) and deletions (~~strikeout~~) through 20 June 1997. Attached at the end of this document are the 20 June 1997 Errata Sheets.	Admin. Change